THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

There has been little heart in business since Saturday. At this writing the country is full of mourning, and Thursday is to be a day of complete giving up to the national sorrow. Surprising stability, even in view of the safeguards of our system and the strong confidence in the new President, has been shown at every point in the business world in the past week. In the iron trade the situation is one of marked strength. That the steel strike has been settled by agreement adds to the favorable outlook, for while the strikers' cause was plainly lost, the struggle might still have dragged on and cut off tonnage, some of which could not be made up. It is difficult to estimate accurately how much the output of finished material has been curtailed, but it is probably upward of 250,000 tons of tin plates, sheets, bars, hoops and ties and pipes and tubes. There has been no actual famine, but a close approach to it, and stocks in jobbers' hands have been exhausted in some lines and seriously broken in others. Replenishment will be the order on all hands and even with the fullest operation of the mills recently idle it will be months before any slackening will be possible. The policy of the large producers as to prices, as outlined in our Pittsburg report, will be substantially the maintenance of the basis existing when the strike was declared. Consumers everywhere are now calling for their material under contracts with the resuming mills and the latter are fairly swamped. There is no evidence of the easing in prices that has been looked for in some quarters as the result of increasing production. Mill prices on contracts have indeed been quite steady, even through the strike, and on these there could hardly be any change under existing conditions, unless it should be toward greater firmness. Premiums for quick deliveries will naturally be lessened and on some materials may disappear as jobbers' stocks are evened up. A study of the statistical situation in pig iron in connection with the action of the steel corporation in taking all shipments of Bessemer iron suggests that had it not been for the steel strike an actual scarcity in steel-making pig iron might have developed. Contrary to expectation, it is now understood that purchases of Bessemer iron for October delivery will be made by the steel corporation. Basic iron is steadily in demand and it is evident that all that merchant furnaces in the Central West and in the East as well as in the South can turn out will be needed before the end of the year. Foundry buying has been on a larger scale in the past week. Cincinnati reports a number of large pig iron transactions, part of the tonnage being gray forge and No. 4 foundry for pipe works in that district. Weak sellers are advancing their prices to the level maintained for some time by others, and in the Birmingham district $10.50 is now minimum for No. 2 foundry. Northern furnaces maintain a minimum of $13.50 at Valley furnace for No. 2 foundry; not a few sellers who have disposed of their output for the year now ask higher figures. The malleable trade, which was a heavy buyer in late July, is consuming iron at an unprecedented rate, and further large buying is expected from this source before the end of the year. The foundry trade is most insistently pressing for deliveries, and in the buying of the past week has covered its wants for a longer period than has been the rule for months. Malleable and car wheel irons were conspicuous in these purchases, and soft foundry grades have been in such demand that a scarcity exists. It is stated that while the stocks in furnace yards represent about a week's supply the iron is largely off grades. Rail buying continues to make strong prophecies for the steel situation of next year. While no figures are availabie as yet, there is good reason to put the total purchases thus far considerably above anything yet stated in tentative estimates.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, Sept. 18.

The settlement of the steel strike has removed the greatest disturbing factor in an otherwise active and strong market, and iron and steel manufacturers generally are exceedingly pleased that the trouble has ended. While the Amalgamated Association officials are experiencing some difficulty in getting the men to return to work upon the terms secured, it is altogether probable that all the mills tied up by the strike will be in operation within the next week or ten days. The American Steel Hoop Co. already has all its mills in operation. The men in the Youngstown district returned in a body this week while the few idle mills at the Pittsburg plants, were set in operation on Monday by the former employes returning to work. The American Sheet Steel Co. is now operating 85 per cent of all its mills and it is reported that the Wood plant at McKeesport, Pa., will resume operations next week non-union, according to the terms of the settlement. As yet there has been no general resumption of operations at the mills of the American Tin Plate Co., although fully one-fourth of the company's capacity is in operation. The National Steel Co. will have the last of its idle plants going next Monday, while the National Tube Co. expects to operate all its Pittsburg and McKeesport, Pa., plants in full before the end of the week. At Wheeling, W. Va., the men have not yet signified their intention of returning to work, but with the resumption of operations at Pittsburg and McKeesport, they, too, are expected to follow. The strike so far as the Illinois Steel Co. is concerned was practically over last week, when the men employed at the Joliet plant returned to work.

Now that the strike is over it might be well to refer to the market policy to be pursued by the companies producing such finished materials as have been advanced since the strike was declared. The American Tin Plate Co. has not made a change in prices, nor will one be made on tin plates for delivery in the remainder of the year. Several months ago it was announced that the price of 100 pound boxes of coke plates would be $4 during the last three months of the year and the price will remain unchanged despite the fact that the pressure for deliveries is very great, and the mills are behind orders. Shipments of tin plate cannot be commenced by the American Tin Plate Co. before Oct. 1 and until that time spot plate will continue to command premiums. Present quotations are $6.25 to $6.50 per box while jobbers quote plates for November shipment at $4.30 per box. The American Sheet Steel Co. will continue former quotations despite the fact that jobbers still ask premiums for goods for prompt shipment, and independent

manufacturers ask premiums amounting to $3 per ton for November shipment. While it will be some time before the company can catch up on its deliveries the operation of 85 per cent of its mills will greatly relieve the situation. The National Tube Co. has made no change in prices and none is in contemplation at the present time. While it will be some tme before the mills will be able to catch up on accumulated business, it is promised that consumers will be well looked after, and with the increased shipments due to an early resumption of all plants of the company, it is believed that the shipments will be well caught up by the first of the year. With the American Steel Hoop Co. the amount of accumulated business is less than with any of the other companies owing to the fact that several of its large mills were placed in operation non-union shortly after the strike was declared, and in addition much of the business that would have fallen to this company during the month of July was placed with other concerns. The resumption of operations at the three big steel plants of the National Steel Co. will relieve to a large extent the billet, sheet and tin bar situation. As to the Illinois Steel Co. the strike was never considered very serious.

With all these mills operating in full for months to come, on accumulated orders, there can be no doubting the continued strength of the market and there is every indication that this curtailment of production during the strike period will affect the situation far into the spring.

The rail situation at present continues to engage the attention of the steel trade and it is furher reported this week that there has been considerable buying of standard sections for delivery next year at $28 per ton.

PIG IRON.—Now that there will be a genera! resumption at the idle plants of the United States Steel Corporation it is believed that requirements of both Bessemer and basic iron for delivery during the next month will be covered within the next week or ten days. The buying of Bessemer iron during the week is limited to one lot of 4,000 tons of high silicon at $15.25 per ton at the furnace. The demand for foundry iron is also reported better than for some time and sales of the week amount to about 3,000 tons. Some of this iron is for delivery during the next three months, while a large portion will not be taken out until next April. Sales of forge iron amounted to about 5,000 tons at $13.50 to $13.60, delivered, Pittsburg. We revise our quotations as follows:

Bessemer, Valley	$15 00 to 15 25
Bessemer, Pittsburg	15 75 to 16 00
No 1 Foundry	14 75 to 15 00
No. 2 Foundry	14 00 to 14 25
No. 3 Foundry	13 50 to 13 75
Gray Forge, Pittsburg	13 50 to 13 60
Chilled Basic, Valley	14 50
Chilled Basic, Pittsburgh	15 25

STEEL.—A fair demand continues for Bessemer billets for prompt delivery and several 100-ton lots were sold during the past week at $25 per ton. For extended delivery $24 per ton is quoted. Open-hearth billets are quoted at $25 to $26 per ton. Wire rods are in .air demand at $34 to $35 per ton.

FERRO-MANGANESE.—Foreign 80 per cent ferro is selling at $53.50 per ton while domestic in large lots is quoted at $55 and small lots are selling up to $60 per ton.

SPELTER.—The spelter market remains practically unchanged and prime Western grades are quoted at 3.93c, Pittsburg.

MUCK BAR.—We note the sale of 500 tons of muck bar for delivery during the next 30 days at $30.50 per ton.

SKELP.—The resumption of operations at the rolling mills of the National Tube Co. will greatly relieve the skelp market which still rules comparatively high. Iron skelp, both grooved and sheared, is held at 2.05c to 2.15c, while skelp is quoted 1.90c to 1.95c.

RAILS AND TRACK MATERIAL.—The contracting for steel rails for delivery next year continues and a comfortable tonnage is already booked by the leading rail manufacturers at $28 per ton. Our quotations are as follows: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons, $30; less than car lots, $32; light rails, 8 pounds, $45; 12 pounds, $38; 16 pounds, $35; 20 pounds, $34; 25 to 40 pounds, $32. Track material: Spikes, 1.95c to 2c; track bolts, square heads, 2.40c; hexagon heads, 2.55c; fish plates, 1.50c to 1.60c.

PLATES.—New business on plates now being closed exceeds the daily shipments and mills are gradually falling further behind on their orders. The market is strong and prices remain unchanged as follows: Tank plate, ¼-inch thick up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. M. B. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c; and it ranges in price to 3c. Plates more than 100 inches wide, 5 cents extra 100 pounds. Plates 3-16 of an inch in thickness, $1 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5 cents extra a hundred pounds for less than carload lots. Terms, net cash in 30 days.

BARS.—A fair demand continues for steel bars and the leading manufacturers are all comfortably filled until January. Large lots for delivery after the first of the year can be placed at 1.40c to 1.45c, while more than carload lots for delivery within the next two or three months command 1.50c. Small lots cannot be placed any lower than 1.55c to 1.60c. Common iron bars are held at 1.45c to 1.50c, while refined bars are held at 1.75c and upwards.

PIPES AND TUBES.—The strike at the tube plants of the National Tube Co. has resulted in curtailing nearly one month's production and it will require fully three months to catch up on the accumulated business. Operations at all the idle mills will no doubt be resumed by the first of next week and the full operation of all the plants of the combine is promised until after the first of the year. The National Tube Co. continues quotations effective before the strike was declared but independent manufacturers are not yet meeting these discounts. Discounts to consumers in carload lots, Pittsburg, are as follows:

MERCHANT PIPE.

	In carloads. Blk.	Galvd.	Less than carloads. Blk.	Galvd.
⅛ to ⅜ inch and 11 to 12 inches	59.2	46.2	54.9	42.5
½ to 10 inches	66.7	53.3	61.9	49.9

BOILER TUBES.

	22 Feet and under. Per cent. Iron.	Steel.
1 to 1¾ and 2½ to 5 inches, inclusive	43½	65¼
2 to 2½ inches, inclusive	43	60
6 inches and larger	53	59

CASING.

	S. and S. Per cent.
2 to 3 inches	58
3½ to 4 inches	63
4½ to 12½ inches	65

O. D. PIPE.

	Per cent.
1¼ to 22 inches	42
4 inches, o d. and larger	37

THREADS AND COUPLINGS.

	Per cent
¼ to 16 inches o. d.	35

SHEETS.—This week officials of the American Sheet Steel Co. report that 85 per cent of their mills are in full operation and within the next week or ten days all mills will no doubt be operating in full. Deliveries on sheets are growing much better and as a result quotations for spot shipments, No. 28 gauge have dropped to 3.75c and No. 27 gauge to 3.60c. Independent manufacturers are quoting 3.35c for No. 28, one pass through cold rolls for future delivery and 3.25c for No. 27 gauge. The American Sheet Steel Co. makes the following quotations: On lots in 500 bundles or more of black sheets, one pass through cold rolls: Nos. 10, 11 and 12, 2.30c; Nos. 14 and 15, 2.40c; Nos. 16 and 17, 2.50c; Nos. 18, 19, 20 and 21, 2.60c; Nos. 22, 23 and 24, 2.70c; Nos. 25 and 26, 2.80c; No. 27, 2.90c; No. 28, 3c; No. 29, 3.15c; No. 30, 3.25c. On lots less than 500 bundles the American Sheet Steel Co. will not make shipments except through jobbers, and for direct shipments from mill in less than carload lots an extra charge of 10 cents per 100 pounds is made. Galvanized sheets are held at 70, 10 and 5 off in lots of 500 bundles and over, and at 70 and 10 in smaller lots. Galvanized sheets for spot shipment are held at 65 and 5 off.

STRUCTURAL MATERIAL.—Demand for structural material for delivery early next year continues strong and the largest local producer of structural steel outside of the United States Steel Corporation is breaking all previous production records. Prices are unchanged as follows: Beams and channels, 3 to 15 inches, 1.60c; I 8to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 6 inches, 1.60c; universal mill plates, 1.60c.

WIRE AND WIRE NAILS.—Demand for wire nails is reported

very heavy by the jobbers and the farmers are also buying wire products to such an extent that jobbers are practically unable to keep up their stocks. We make the following quotations: Single carloads of wire nails to jobbers, $2.30, Pittsburg, to retailers, $2.40; plain wire, carload lots is quoted at $2.25 to jobbers and $2.35 to retailers; painted barb wire, $2.60 in carload lots to jobbers, and $2.70 to retailers; galvanized barb wire, $2 in carolad lots to jobbers, and $3 to retailers. Cut nails have been advanced to $2.05, Pittsburg, in carload lots, 2 per cent off in 10 days.

MERCHANT STEEL.—Heavy buying of steel shafting has greatly stimulated the market and slight advances have been made by certain manufacturers. Turned, cold rolled and ground shafting is quoted at 60 per cent off for car lots and 55 per cent off for less than car lots; tire steel in carload lots and over, 1.60c, less than carload lots, 1.75c to 1.80c. Toe calk is sold at 1.70c in large lots, and in small lots as high as 1.85c. Tool steel is held at 7c and upwards, according to quality.

OLD MATERIAL.—A better demand for all classes of old material is reported and the market will be greatly stimulated by the general resumption of the closed mills of the United States Steel Corporation. We make the following quotations: Heavy melting stock, $15 to $15.50; low phosphorus melting stock, $16.50 to $17.50; steel rails, $15.50 to $16; busheling scrap, $13 to $14; No. 1 wrought, $16 to $17; iron rails, $18 to $19; cast borings, $6.50 to $7; cast scrap, $13.50 to $14.

COKE.—For the week ending Saturday, Sept. 7, the total estimated production of the Connellsville region amounted to 223,555 tons, an increase of nearly 16,000 tons over the previous week. Now that the steel strike has been declared off the ovens in the region that have been working but five days per week will be operated full time and the production will again be increased by more than 10,000 tons per week. Shipments for the week amounted to more than 10,000 cars. Connellsville furnace coke is held at $1.75 to $2 per ton while foundry is held at $2.15 to $2.40. Outside furnace coke is held at $1.30 to $1.60 and foundry is quoted at $1.90 to $2.15.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
534 MONADNOCK BLOCK, Sept. 17.

With the termination of the steel strike, the local market has taken on a more optimistic appearance, which not even the national bereavement into which the country has been plunged, can be said to have dimmed. This returning confidence may be noticed in the increase in the size and volume of orders, which have been growing larger as the reports from the East continued to indicate an early settlement between the Amalgamated Association and the United States Steel Corporation. While there is still good buying in small lots for immediate shipment, the haste which consumers of both raw and finished materials have shown in the past two months to place contracts for early delivery has entirely disappeared. Buyers are now disposed to contract for larger lots and for deliveries extending into the first half of next year. There has been a disposition among some buyers to believe that with the resumption of work in the mills that were closed by the strike there would be a reduction of prices when the increased output made itself felt. In view of the depletion of jobbers' stocks and the large accumulation of unfilled orders, it seems quite certain that no reductions will be made on finished material. The demand for scrap iron, which has been at a very low ebb all summer, continues to improve and sellers are now getting better prices than at any time since the slump in the spring.

BARS.—The mills are no longer booking orders for immediate delivery, having contracted all they can supply for the next two months. The settlement of the steel strike will undoubtedly deflect considerable business into Eastern channels, the United States Steel Corporation being now actively engaged in taking orders for long time delivery. Business during the past week has been up to past averages, consumers feeling more disposed to contract for their requirements up to next July. We quote steel bars for immediate shipment, 1.70c, Chicago, and iron, 1.65c, Chicago. Out of store, steel, 1.90c; iron, 2c; on contracts for large lots and extended deliveries, steel, 1.55c; iron, 1.60c.

PIG IRON.—Though there is not the active buying that might be expected for this time of the year, there is nevertheless an excellent inquiry. There is a decided scarcity of iron for prompt shipment. The feeling in the pig iron market grows stronger each week, returning confidence being seen in the increase in size and volume of orders. No change has yet been made in the price of Southern irons, but local selling firms expect to announce one shortly, all quotations being made subject to immediate acceptance. The molders' strike continues to grow less of a factor in this district, the local foundrymen being able to get more men every week to take the strikers' places. We quote as follows:

Lake Sup Charcoal...	$17 50 to $18 00	Southern Coke No. 4..	$13 90 to $14 15
Local Coke Fdy. No.1	15 50 to 16 00	Southern No. 1 Soft...	15 40 to 15 55
Local Coke Fdy. No.2	15 00 to 15 50	Southern No. 2 Soft...	14 90 to 15 15
Local Coke Fdy. No.3	14 50 to 15 00	Southern Silveries.....	15 45 to 15 50
LocalScotch Fdy. No 1	15 50 to 16 00	Jackson Co. Silveries	17 00 to 17 50
LocalScotch Fdy No.2	15 00 to 15 50	OhioStrong Softeners	16 50 to 17 00
LocalScotch Fdy No.3	14 50 to 15 00	Alabama Car Wheel...	21 00 to 22 00
Southern Coke No. 1	14 65 to 15 15	Malleable Bessemer..	16 00 to 17 00
Southern Coke No. 2	14 15 to 14 65	Coke Bessemer.....	17 50 to 18 50
Southern Coke No. 3	14 15 to 14 65		

SHEETS.—There is no change in the conditions that have affected this market. With the announcement that the strike had been settled consumers have deluged the local offices of Eastern mills with letters and telegrams asking when they can promise shipment of material. Jobbers are still reaping a harvest by their foresight in laying in a large stock of material, though these stocks are rapidly disappearing. Prices are irregular, according to the size of order and stock in hand. We quote, as follows: No. 27 black, 4.10c to 4.25c; and galvanized, 60 per cent and 5 per cent from store.

STRUCTURAL STEEL.—All local sellers unite in saying that business could not possibly be better. The strike in the Building Trades Council last year delayed work on many buildings, with the result that architects and contractors are endeavoring to catch up this year on the work that was postponed. At the present time operations are being rushed on buildings, in this city, representing a total valuation of $8,421,000, according to a local paper, which is also authority for the statement that these active building operations will be carried on during the winter. We quote mill shipments, carload lots, as follows: Beams, 15 inches and under, 1.75c; 18 inches and over, 1.85c; angles, 1.75c to 1.80c; plates, 1.75c, base; tees, 1.80c; zees, 1.75c; small lots from store, ¼c higher; beams and channels from store, ⅛c to ¾c per pound higher.

RAILS.—There is a continued good inquiry from railroads for delivery next year, the local interest having booked a large tonnage at $28 per ton. There is a good demand for light rails and track supplies, though mills are still behind in deliveries. Our quotations follow: Standard rails, $28; light sections, $33 to $35, according to size; out of store, $40 to $44; splice bars, 1.60c to 1.70c; spikes, 1.90c to 2c; out of store, 2c; track bolts, hexagon nuts, 2.80c to 2.90c; out of store, 2.90c to 3c; square nuts, 2.65c to 2.75c; out of store, 2.75c to 2.85c.

MERCHANT STEEL.—The demand keeps up from all branches of the trade, a number of contracts being reported from implement manufacturers. Prices are very firm in view of the announcement made last week that certain large manufacturers had notified their agents that all large orders be submitted to the home office before acceptance is made. Our quotations follow, for mill shipments, Chicago delivery. Smooth finished tire steel, 1.90c to 2c; open-hearth spring steel, 2.50c to 2.75c; toe calk, 2.40c to 2.60c; sleigh shoe, 1.85c to 1.90c; cutter shoe, 2.40c to 2.60c; ordinary tool steel, 6c to 7c; specials, 13c and upwards. Cold rolled shafting, carload lots, 55 per cent and upwards.

PLATES.—There is no change to be reported. Business is of fair proportions, being confined mostly to small orders. We quote as follows: Tank steel, base, ¼-inch, 1.75c; flange steel, 1.90c to 2c; marine steel, 1.95c; firebox steel, ordinary, 2c to 2.10c; special, 2.25c and upwards. Tank steel from store, 2c to 2.20c; flange steel from store, 2.25c.

MERCHANT PIPE.—Local jobbers continue unable to fill orders, and many consumers will have to wait until the mills of the National Tube Co. get into operation again. There is a scarcity in all sizes, and jobbers' prices vary according to stock on hand and size of order. We quote, random lengths, as follows:

	Black Per cent.	Galv. Per cent
⅛ to ¼ and 11 to 12 in.	59	37
⅜ to 10 inches	60	46

WIRE AND WIRE NAILS.—There is an excellent demand for all kinds of wire products, from all sections of the country. The local interest reports that its facilities for prompt shipment are now better than they have been for some time past, and all orders are being filled within a reasonable length of time. The resumption of work in the Joliet mills of the Federal Steel Co. has improved the local situation. We quote: Carloads of wire nails to jobbers, $2.40, Chicago; to retailers, $2.50; plain wire, carload lots to jobbers, $2.35, to retailers, $2.45; painted barb wire to jobbers, carloads, $2.70, to retailers, $2.80; galvanized barb wire, carloads to jobbers, $3, to retailers, $3.10.

OLD MATERIAL.—Not since the slump in prices that was made late last spring, has the demand for scrap iron been better. There is a ready market for relaying rails, busheling scrap, turnings and borings, while other descriptions are not slow in finding a buyer. We revise our prices as follows:

Old iron rails	$20 00 to $21 00	Old Wheels	$16 00 to $16 50
Old steel rails, long	16 00 to 17 00	Heavy melting steel	13 00 to 13 50
Old steel rails, mixed	13 50 to 14 00	Mixed country steel	10 00 to 10 50
Relaying rails	24 00 to 25 00		

The following are selling prices per net ton:

No. 1 R. R. wrought	$16 00 to $16 50	Iron axles	$20 50 to $21 00
No. 2 R. R. wrought	13 00 to 13 50	Cast borings	4 00 to 4 50
Dealers' forge	12 50 to 13 00	Wrought turnings	10 00 to 10 50
No. 1 busheling	10 50 to 11 00	Iron axle turnings	11 00 to 11 50
Heavy cast	11 00 to 11 50	Steel axle turnings	9 50 to 10 00
Railway malleable	12 00 to 12 50	Stove plates	7 50 to 8 00
Country malleable	10 50 to 11 00	Old iron splice bars	16 00 to 16 50

CINCINNATI.

Sept. 17.

There is not a great change noticeable in the iron trade this week over last. The effect of the death of the president was not to unsettle conditions or even to cause a cessation of buying on the part of consumers of pig iron or finished material. This was because in this locality at least there is the utmost confidence in the stability of the government and its present policy. Thanks to President McKinley's efficiency and clear mindedness, his death leaves no uncertainties and unsettled conditions. The settlement of the steel strike will probably result in a short time in causing much buying that has been delayed to come out, but as far as the market itself is concerned it is not thought here that there will be any change. It is generally believed that the United States Steel Corporation has a good many orders booked at prices that might be called low and that rather than have the market ease up on the prospect of full operation of all mills the corporation will direct its efforts to maintain the market at about what it is today in order that at present prices it may get a chance to even up. On the other hand it is known that some large buyers in this market who have contracts with the United States Steel Corporation and want material right away will neither press the mills for delivery nor give them new orders, but will rather go to outside mills. Thus an element of strength and suppport will be afforded all around.

A striking feature of the week has been the number of large orders reported by some of the pig iron men. One concern reports one 15,000 ton order, one 10,000 ton order, one for 3,000 tons and another for 2,500 tons. Most of the business is for foundries and it is understood that one of the largest buyers has been the Addyston branch at this city of the United States Cast Iron Pipe & Foundry Co. Another important buyer was a large stove company outside of Cincinnati and another was an agricultural implement concern.

PIG IRON.—Beside the large orders that have been directly reported there has been a good demand for carload lots and up to 500 tons. Delivery on the larger orders runs well into next year while some of the small orders are for the earliest delivery obtainable. In spite of this business the market has not moved and prices are just the same as at last report. The demand is so well distributed through the list and so well scattered as to concerns that there has been no trouble in supplying it all. Foundry iron has led in activity but there has also been a good demand for gray forge. Reports from furnaces closely allied to local interests indicate that there will be no trouble about getting iron in spite of the fear expressed by some that production was getting a little behind. Prices at Cincinnati are as follows:

Southern Fdy. No. 1	$13 50 to $14 00	Northern Fdy. No. 1	$14 75 to $15 25
" " 2	13 00 to 13 50	" " 2	14 25 to 14 75
" " 3	12 50 to 13 00	Charcoal C. W. iron	17 50 to 18 50
" " 4	12 00 to 12 50	Malleable coke iron	15 00 to 15 25
So. Fdy. No 1 soft	13 50 to 14 00	Gray Forge mottled	12 0 to 13 25
So. Fdy. No. 2 soft	13 00 to 13 50	Jackson Co. Sil'y No. 1	15 25 to 15 50

FINISHED MATERIAL.—The demand for finished material is still good and immediate delivery is in many cases out of the question. Prices out of store are still at a good premium over mill prices when delivered. Customers do not show direct impatience, however, and it seems to be easy to satisfy them with the promise of delivery as soon as possible. It is reasonable to suppose that the settlement of the steel strike will ease the conditions up considerably, but it is not thought that market prices will weaken. The situation is too strong in itself. The best thing about the settlement of the strike will be that before long there will be some chance of getting sheets and plates without waiting so long for them or paying such a premium. Prices are about as quoted last week. Iron bars are 1.65c base, and steel bars, 1.60 to 1.65c base. Angles are firm at 1.85 to 1.90c. Plates are still quoted by mills at 1.85 to 1.90c delivered, and sheets at 3.35 to 3.40c for No. 28 and 2.05 to 2.10c for No. 12 blue annealed. On No. 28 sheets 4 cents will about get them on quick delivery, while stores are asking 2.70c for No. 12 blue annealed.

OLD MATERIAL.—No change has been noted in the scrap market, which holds firm with the market for pig iron. There have been no large amounts moving, and prices for gross tons are about as they have been for two or three weeks as follows: Old No. 1 railroad wrought, $14.00 to $14.50; cast machine and foundry, $12.25 to $12.50; old iron rails, $17.50 to $18.00; old steel rails, $14.75 to $15.00; old steel rails, short lengths, $13.50 to $13.75; old iron axles, $18.50 to $19.00; old car wheels, $16.75 to $17.00; stove plate, $9.75 to $10.00; wrought turnings, net tons, $10.00 to $10.75; cast borings, $6.75 to $7.00.

PHILADELPHIA.

Sept. 17.

The marked increase in the demand for pig iron which has developed during the week is taken as an indication that considerable new business has been booked by consumers, otherwise they would be in no hurry to cover their wants to the extent which has taken place. So far as the judgment of those connected with the market goes all conditions are favorable for a good winter's trade and the firmness in prices lately shown is conclusive evidence that nothing unfavorable is expected. Stocks on hand will not be adequate to take care of any material increase in demand should such take place, the supply now carried representing only about enough material for ten days' consumption.

PIG IRON.—While prices can not be said to have advanced it is becoming more and more difficult to place even large orders at anything but full figures. Some makers are reluctant to accept any more business at ruling prices, having contracted for fully 75 per cent of their output during the remainder of the year. Consumption is being maintained and the eagerness to buy would indicate that there is a great deal of new work in prospect. Sales have been unusually large during the week, the movement extending through New England and New York as well as Pennsylvania points. Prices for this city and vicinity average about as follows: No. 1 X foundry, $15.50 to $16; No. 2 X foundry, $14.85 to $15.25; No. 2 plain, $14.25 to $14.75; standard gray forge, $13.75 to $14; ordinary gray forge, $13.25 to $13.50; basic (chilled), $14 to $14.25.

FINISHED MATERIAL.—The practical settlement of the steel strike will do much to relieve urgent demands and easier prices are to be expected as soon as stocks can be replenished, which may take some time as the present urgency will call for very nearly the full product of the mills. We continue the prices last quoted for Philadelphia and nearby deliveries: Plates, ¼-inch and thicker, 1.75c to 1.80c; bars, iron or steel, 1.60c to 1.65c; angles, 1.75c to 1.85c; beams and channels, 1.75c to 1.85c

OLD MATERIAL—Good steel melting stock is scarce and prices firmer. Other lines are steady and unchanged. Bids and offers range about as follows for deliveries in buyer's yard: Choice railroad scrap, $17.75 to $18.50; No. 1 yard scrap, $13.75 to $14.25; No. 2 light scrap, $12 to $12.50; machinery cast, $13.75 to $14.25; heavy steel scrap, $16.50 to $17; old iron rails, $19 to $20; old steel rails, $16.75 to $17; wrought turnings, $11.50 to $12; cast borings, $7.25 to $7.75; old car wheels, $16.50 to $17; old iron axles, $22 to $23.

The Pan-American Exposition-VIII

(Staff Correspondence.)

BUFFALO, Sept. 17.—The Bucyrus Co., of South Milwaukee, Wis., has a ponderous machine on the New York Central tracks at one end of the Railway Exhibit Building. It is a 65-ton all-steel shovel with a three-yard dipper. It is mounted on an all-steel car, 37 ft. 6 in. long by 10 ft wide; the car beams are made of 15-in. I-beams; the outside sills 60 lbs. to the foot and the inside sills 75 lbs. The whole front of the car is a single steel casting, weighing, so I am informed, some 6,000 lbs. This takes the thrust of the boom and supports the A-shaped frame, to which the jack-arms are also hinged. The hoisting chain is 1¼ inches and, as may be surmised from the class of work these shovels are intended to do, the mechanical details are of the most rugged construction. And I notice that the design of the engine and frame of the hoist have been arranged to offer a minimum amount of difficulty in taking down the parts, should there be need at any time for investigation or repairs. This is a point of no small degree of importance, as these tools are to be used under conditions where the higher type of machine-shop facilities is not always obtainable. There is no doubt, however, that the shovel will stand vigorous use, and is not likely to weaken under ordinary service. The main dimensions are as follows: Hoisting engines, double 10 in. x 14 in.; ratio of gearing, 5 to 1. Independent engines for thrusting and for swinging, each double 7 in. x 7 in. All gears and sheaves with steel rims and cast iron centers; steel boom, 28 ft. in length; dipper arm of double 15 in. I-beams, with cast steel rack. Swinging ropes of 1¼ in. plow steel. Pull on the hoisting chain, 25,000 lbs. Thrust on the boom engines is 17,600 lbs. Boiler of locomotive type, 54 in. diameter, 12 ft. 3 in. in length, having 121 2-in. tubes; equipped with injector and duplex feed pump; working pressure 100 lbs. steam.

It is surprising to note the ease with which these heavy machines are handled. They imitate closely the human handler of the shovel and not only handle the material with precision, but manage to get along without the preliminary pick that precedes the spade in other digging operations, as the steam shovel is supplied with a set of hardened teeth to loosen the earth. The Bucyrus Co. has an outdoor location and has therefore erected a handsome pavilion as a part of its exhibit and for the convenience of its friends. This building is adorned with many photographs of the company's productions and has also two large models of dredges.

The Reeves Transmission Exhibit.

The Reeves Pulley Co., of Columbus, Ind., displays one of their regular 100-h. p. variable speed transmission devices: this transmission is illustrated in the foreground of the halftone. The conspicuous features of the Reeves transmission are two sets of cone discs, spline-mounted on two parallel shafts. One disc of each set is attached to a bar, pivoted on an offset, and operated by a screw in such a manner as to bring together one set of discs, as the other set is forced apart. The inner sides of these discs, as will be seen, form a V-shaped groove in which is fitted a specially designed belt, having the tractional bearing on the edges instead of the bottom as in an ordinary belt. The combination of bars and pivots preserves a substantially uniform tension on the belt, one set of discs acting as a driver and the other as the driven. As the driving circumference of the one is increased the other is decreased; the power is transmitted and the possible speed variation is dependent upon the range of the sets of cones. The pivoted levers have ball-bearing thrust collars, which rest against the hubs of the discs. The belt is composed of a band of flexible material, carrying cross-tractional strips which engage with the discs of the machine. The strips are secured with screws which pass through a strengthening strip or washer on the back of the carrying band.

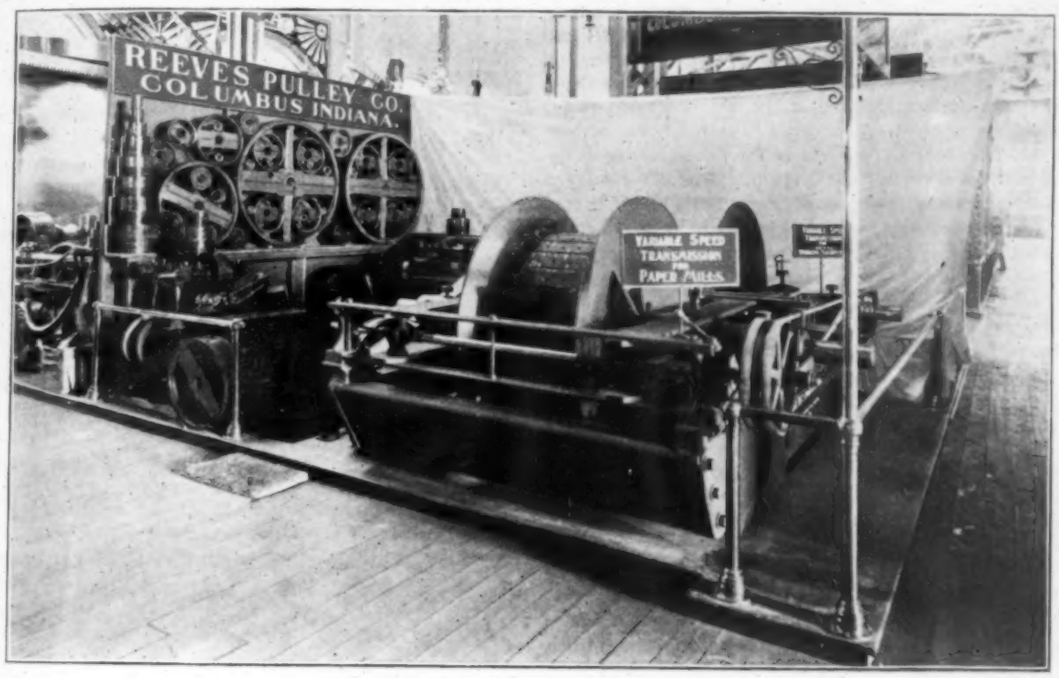

FIG 1.—EXHIBIT OF THE REEVES PULLEY CO.

There is no doubt that a good variable speed transmission has a large field of usefulness among machines of all types. One has but to go over to the other side of Machinery Hall and take a look at the automobile exhibit to find where a device of this sort may be wanted later. When the automobile is developed from another point of view from that now common, the speed changing device will be a necessity in the application of explosive motors to heavy trucks, or present indications are very deceptive. But the greater need is for something of this sort in the machine shop. Most of our tools have cones, but the effort to change from one speed to another frequently stands in the way of due advantage being taken of a change in speed. The change from one step to another may be too great anyway, and there is a constant loss in productive ability that sets at naught all other considerations. Possibly the worst example is the planer. This is one of the most frequently used tools in the shop and as a rule no provision is made for a change of speed. They run at a constant speed and as that cutting speed is limited to the slowest that

may ever be required, there are many occasions when the planer comes far short of the work it is really capable of doing under other conditions. An emery or carborundum wheel has a periphery speed at which it is equally safe and efficient, but there are few shops where provision is made for an increase of speed as the wheel wears away. Here is the opportunity of a speed transmission device that will stand up to business under the stress and strain of frequent and irregular changes in power and speed demanded.

The large transmission shown in the half tone is identical with the smaller machines in principle, in every detail, with the exception that the variable screw is operated by power. This is controlled by a tight and loose pulley arrangement: on one of the two loose pulleys is placed a straight belt and on the other a cross belt; either can be shifted to the tight pulley at will, thereby operating the screw in either direction and accomplishing the desired variation. When the lever is set free, it automatically shifts both belts to their respective loose pulleys, causing the transmission to remain at a fixed speed until a change is again desired.

The Reeves Co. exhibits a line of wood-split pulleys, which may be seen to the left of the illustration.

New Find at Champion Mine.

The recent discovery of ore about one-fourth mile east of the first opening at the Champion mine, Champion, Mich., is a matter of interested comment in Lake Superior iron mining circles. The new deposit has been stripped for 100 to 150 feet in length and shows from 4 to 20 feet in width, which is about as wide as the surface showing at the old Champion mine. If it should widen as the work deepens, as has been the history of the old workings, the life of the Champion property will be greatly prolonged. The Negaunee *Iron Herald* says:

"The ore is practically an outcrop, there being but from one to four feet of stripping and is shown to be of high grade by a series of analysis. Preparations have been made for sinking and until this work is somewhat advanced, Superintendent Fitch declines to express an opinion as to its extent, though the substantial equipment provided for the exploratory work may at least be taken as evidence that he has considerable confidence in the value of the new discovery, in spite of the fact that the constantly changing conditions of the old workings during his long connection with the company, has caused him to become conservative and cautious in any estimate of future prospects. The old mine is now looking better than for some years, the ore breadth at the bottom—1,900 feet from the surface—being about 160 feet, with every appearance of still widening as further depth is attained. Should it transpire that the new find will develop as the big end of the old Champion, as many are willing to predict, it will be but the strongest of evidence in support of the contention of many, that the mining industries of the country are yet in their infancy. Besides this instance, other recent discoveries are not wanting. In this line may be cited the large deposits of ore recently located on the Hartford at Negaunee and on the more recently acquired mineral holdings of the Cleveland-Cliffs Co. at the same place, but little more than a stone's throw from the point where the first ore in the county was discovered nearly 60 years ago. Whatever may be the result of the discoveries here noted, it is perfectly safe to say that no adequate estimate can be made of the future possibilities of the county, in respect to the production of all grades of ore of marketable value.

The Deering Harvester Co., Chicago, has purchased a controlling interest in the Mann Mfg. Co., Ltd., of Brockville, Ont., one of the largest agricultural implement manufacturing concerns in Canada. A reorganization of the company has been made, Richard F. Howe, who has been elected president of the company, representing the Deering interests. The other officers are B. A. Kennedy, vice-president, and J. A. Publow, secretary, treasurer and manager.

On Oct. 7 a charter for the Fort Pitt Malleable & Grey Iron Co. of Pittsburg, Pa., will be asked for at Harrisburg, Pa. The new company will operate an iron and steel foundry for the manufacture of malleable and gray iron castings. The incorporators will be John C. Reilly, James D. Callery, F. J. Lanahan, John Murphy and Joseph A. Weldon.

REAL STRIKE SETTLEMENT YET TO BE MADE.

(Special Telegram.)

PITTSBURG, Sept. 18.—It is now reported that no signed agreement was entered into between the Amalgamated Association and the representatives of the American Sheet Steel Co., American Steel Hoop Co. and American Tin Plate Co., but that only a verbal agreement was made. It is alleged that it was to the effect that the men return to work in all the mills and that after resumption had been accomplished an agreement would be entered into. It was specifically stated, however, that the scale would not be signed for the mills started up since the strike and only those signed for last year with a few exceptions would be signed for again.

Today the Pennsylvania, Republic, Elba and Continental departments of the National Tube Co. in this city resumed operations and the Monongahela tin plate plant at McKeesport was also started. The lodge organized among the employes of this plant at a meeting last night decided to disband and their charter was sent to President Shaffer as a trophy of the strike. The Boston Iron Works of the National Tube Co. resumed last night. The New Castle steel mill of the National Steel Co. at New Castle, Pa. resumed yesterday and the Greer and Shenango tin plate mills at the same place also started up. Tomorrow all the plants of the United States Steel Corporation will be closed from 6 o'clock in the morning until 6 o'clock in the evening.

Tennessee Coal, Iron & Railroad Co.

The statement recently printed in Birmingham dispatches, that the Tennessee Coal, Iron & Railroad Co. contemplated doubling its open-hearth plant by installing 10 stationary basic open-hearth furnaces is incorrect. The company has been working steadily toward increasing the efficiency of the present plant, and thus far only six of the ten furnaces are in operation. The rail mill is nearing completion and rails will probably be rolled in a few weeks. It is likely that the company will soon equip a plant for the manufacture of hoops and cotton ties.

In the article on "An Efficiency Test of a Continuous Rod Mill" in last week's issue, the intended statement that "in cutting off 'finned ends' no distinction was made between the rods which were to be used by the maker and those which were to be shipped to outside parties" was made meaningless by the omission of the word "no." It should be added that for the second week of the test Pittsburg gas coal was used. The average indicated horse power of the Buckeye engine should have been 24.7 for the first week and 22.9 for the second week, instead of 24 and 22.3 as printed, and the analysis of New Kentucky coal showed 46.8 in nitrogen instead of 48.8 as given.

Improvements have been commenced on the Greenville, Pa., plant of the Shelby Tube Co., which will make it the largest cold-drawn tube plant in the world. A billet plant is to be installed, which will make billets for the Shelby Co. mills at Toledo, O.; Shelby, O.; Hartford, Conn.; Auburn, Ind., and Ellwood City, Pa.

No. 12 beam mill, recently remodeled, at the South Side plant of Jones & Laughlins, Ltd., Pittsburg, Pa., recently produced more than 500 tons of material in 24 hours. The average production of the mill is from 300 to 400 tons daily.

W. C. and John A. Maloney this week filed a bill in equity asking for a receiver for the Kane-Maloney Iron & Steel Co. of Pittsburg. The company has a capital of $25,000 and deals in old material. It is alleged that it is $3,500 in debt and that there are no funds to meet this indebtedness.

The Allis-Chalmers Co., Chicago, has received a contract from the Rapid Transit Subway Construction Co., New York, for 10 large Corliss engines. These are to be of the combined horizontal and vertical type, similar to the eight which the company is building for the Manhattan Electric Railway, of New York. They are rated at 8,000-h. p. each at most economical point of cut-off, and are capable of operating continuously under a load of 12,000-h. p. each.

THE IRON TRADE REVIEW

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SEPTEMBER 19, 1901.

THE PRESIDENT'S LAST WORDS FOR INDUSTRY.

Perhaps no words of our lamented President will be more quoted as biographers seek to describe the genius of his administration, than those contained in his last public utterance. The occasion was one that stirred him to high hopes and enthusiastic prophecy. His first four years in the White House had been a protracted wrestling with problems more trying than any of his predecessors had faced save Lincoln. After the war that President McKinley did his utmost to avert, came the succession of vexing questions that were as inevitable as expansion and as unique as a war undertaken by a strong nation in behalf of a weak and oppressed people. Vindication had come to one after another of the acts of the President relating to the Philippines, Cuba and Porto Rico. His second term bade fair to crown all the toil and anxiety of the first. The visit to the exposition at Buffalo afforded a fitting occasion for some announcement to his countrymen concerning the plans of the President for the larger destiny of the nation. And in these sentences, that are the crystallization of President McKinley's latest thought on our industrial and commercial problems, he let the country know what would be the burden of the state paper he was to send to Congress three months later:

"By sensible trade arrangements, which will not interrupt our home production, we shall extend the outlets for our increasing surplus. A system which provides a mutual exchange of commodities is manifestly essential to the continued healthful growth of our export trade. We must not repose in fancied security that we can forever sell everything and buy little or nothing. If such a thing were possible, it would not be best for us or for those with whom we deal. We should take from our customers such of their products as we can use without harm to our industries and labor. Reciprocity is the natural outgrowth of our wonderful industrial development under the domestic policy now firmly established. What we produce beyond our domestic consumption must have a vent abroad. The excess must be relieved through a foreign outlet, and we should sell wherever we can, and buy wherever the buying will enlarge our sales and productions, and thereby make a greater demand for home labor.

"The days of exclusiveness are past. The expansion of our trade and commerce is the pressing problem. Commercial wars are unprofitable. Our policy of good will and friendly trade relations will prevent reprisals. Reciprocity treaties are in harmony with the spirit of the times. Measures of retaliation are not. If, perchance, some of our tariffs are no longer needed for revenue, or to encourage and protect our industries at home, why should they not be employed to extend and promote our markets abroad? Then, too, we have inadequate steamship service. New lines of steamers have already been put in commission between the Pacific coast ports of the United States and those on the western coasts of Mexico and Central America. These should be followed up with direct steamship lines between the eastern coast of the United States and South American ports.

"One of the needs of the times is direct commercial lines from our vast fields of production to the fields of consumption that we have but barely touched. Next in advantage to having the thing to sell is to have the convenience to carry it to the buyer. We must encourage our merchant marine. We must have more ships. They must be under the American flag, built and manned and owned by Americans. These will not only be profitable in a commercial sense—they will be messengers of peace and amity wherever they go. We must build the Isthmian canal, which will unite the two oceans and give a straight line of water communication with the western coasts of Central and South America and Mexico. The construction of a Pacific cable cannot be longer postponed."

Differ as we may concerning the precise height of our tariff barriers, there will be no doubting that President McKinley was as clear in his conviction that the time had come to use portions of our tariffs as coin with which to buy special privileges in markets either hedged up or about to be hedged up against us, as he ever was in the belief that duties should be so laid as to encourage and protect home industry.

In thus emphasizing these last public words of the President we would not discuss them, but rather would hold them up as an index to what was most conspicuous in the public career of Wm. McKinley. No President has been so peculiarly the champion of industry and of the arts that flourish in peace. Questions of human rights, of our relations with foreign nations, and of national and State sovereignty have largely monopolized American statesmanship. And these in precedence and in time, naturally came before the intricacies of industrial economy. But here was a public man who was peculiarly the exponent of development in agriculture, manufactures and commerce. He found in peace and prosperity victories no less renowned than those of war. It was his special pride that in no other country in the world can labor find such remuneration, the family of the wage-earner find such a chance for education or the head of the family provide more certainly against the necessities of age. It was on the side of human interest that industrial and economic problems most appealed to Wm. McKinley. He was above the merely sordid and mercenary aspects of fiscal policies. And because he was such a man we dwell with peculiar regard upon the concluding words of his Buffalo address:

"Let us ever remember that our interest is in concord, not conflict, and that our real eminence rests in the victories of peace, not those of war. We hope that all who are represented here may be moved to higher and nobler effort for their own and the world's good, and that out of this city may come not only greater commerce and trade for us all, but, more essential than these, mutual respect, confidence and friendship, which will deepen and endure. Our earnest prayer is that God will graciously vouchsafe prosperity, happiness and peace to all our neighbors, and like blessings to all the peoples and powers of the earth."

Of all the eulogies these sad days have brought forth none will be more sincere or more really eloquent than will come from the men in the workshop; for among them Wm. McKinley numbered many of his most loyal friends. The everlasting shame of it all is that such generous appreciation of the achievements and possibilities of free American labor should have found so malignant an answer in any human heart.

THE STEEL STRIKE ENDED.

The opening of the closed mills of the United States Steel Corporation under a formal settlement of the strike is a welcome outcome, not only to the iron trade, but to the business interests of the entire country. As fresh proof that the companies involved were not bent, as alleged, upon the destruction of unionism, the treaty of peace was made by company officers on the one hand and officers of the Amalgamated Association on the other. The latter, it appears, have not satisfied their members, whom they had promised complete victory at the start, and the struggle between employers and men is now followed by an equally bitter one in the strikers' own camp. Again the lesson is being learned that the strike weapon has a fearful recoil when in bungling hands.

The United States Steel Corporation now has the opportunity to demonstrate both to its old employes, or so many of them as can find places, and to those who have entered its mills since the strike began, that it can and will do better things for skilled, efficient and ambitious workmen than any union such as the Amalgamated Association. The latter by its disregard of the welfare of steel workers outside its ranks, by its punishments for teaching others what its members know, and by its limitations upon output and mill efficiency, has shown itself clearly obstructive. While iron and steel works practice has been steadily on the move it has stood still and insisted on the ways of its early days. Its waning strength has been the penalty, and now through a succession of blunders what strength it carried into the strike has been seriously impaired.

The strike was begun with a refusal of conciliation. The American Sheet Steel Co., in its desire to avert strife, offered four more mills than were then on the scale list. The association would have nothing less than complete and unconditional surrender. It made the appeal to force and it has had its way. War it has been and the outcome must be accepted as the fortune of war.

Nothing in all the course of the strike did so much to set public sentiment against the leaders as their open repudiation of labor contracts. After signing a year's contract with the American Tin Plate Co. the association closed all the mills of the company, save one, and later insisted that its members employed in the Federal Steel Co.'s mills under contracts entirely satisfactory to them, should leave their work and inflict serious loss upon their employers. The doctrine that the union is above contracts and that obligation to it supersedes all else has met a severe and a deserved rebuke.

To any who have been disposed to look upon the contest as another struggle of labor to assert its rights and get its due, a review of the developments of the strike must show that the attitude of the union has not been that of an oppressed minion, but rather of a ruler whose appetite for power constantly required to be satisfied with more power. Mr. Shaffer entered the strike as the man on horseback, who would speedily bring the employers of his members to terms of his own making. Nothing has shown so clearly the unfitness of the Amalgamated Association to control the mills of the United States Steel Corporation in the way it sought to control them, as its irresponsible and immoral use of power during the strike.

The strike is over and the steel trade moves on. The United States Steel Corporation has suffered for others in standing in the breach as it has done, but the demand upon it was one to which there was but one answer. Some idols have been demolished in this ten weeks' struggle. The time required to become apt in rolling mill work has been overrated, it has been shown, and the monopoly of the craft which the Amalgamated Association has tried to create has been seriously shaken. The result has been exactly the same as a manufacturing monopoly inevitably faces: a wrong use of power brings fresh competition and the last estate is worse than the first. The defeat of the Amalgamated Association will be no calamity for the scores of thousands of men employed by our iron and steel industries, whom the association would never admit to its ranks, and the other thousands who would not enter. The one corporation out of seven or eight large steel companies that has been bound by the hamperings of the union will be freer, at least for a time, and if the steel corporation wisely uses its opportunity it will be a long day before men can be persuaded again to obey the order of a leader to give up their livelihood and follow him in a campaign for power for power's sake.

Chicago Molders' Strike Virtually Ended.

(Special Telegram.)

CHICAGO, Sept. 18.—The molders' strike in this city, which has been in progress for the past two months, may now be said to be ended. So successful has been the National Founders' Association in procuring men that the strikers have become alarmed and are now deserting the ranks of the unionists in large numbers, eager to be taken back even at the scale of wages which was paid prior to the conference held in this city. The officers of the National Founders' Association and those concerns that have held out against the demands of the strikers, are besieged daily with men seeking for work, and the difficulty now is, not to get enough men but to find work for all that apply.

H. W. Hoyt, president of the association, in an interview with a representative of *The Iron Trade Review* today stated that the strikers taken back agree to work with the men that have been imported and with those who refused to go out, and also to abide by the rules of the shops in which they are employed. "A few irreconcilables still keep up a pretense of a strike," said Mr. Hoyt, "but these do so knowing that they could not get back. We are getting all the men we want and are not worrying about the efforts these men make to prolong the struggle, which so far as the foundrymen are concerned, is already ended."

The Ellington Mfg. Co., Quincy, Ill., which recently purchased the business of the Cornell Machine Co., Chicago, informs us that its new plant in Quincy will be ready for occupancy by Nov. 15. The floor space of the new shops will be about 65,000 square feet, consisting of a foundry, annealing room, storage and shipping room, machine shop, blacksmith shop, pattern and carpenter shop.

NEW DOUBLE-HEADED ROLL LATHE.

In the accompanying illustrations, Fig. 1 represents a double-headed roll lathe, recently completed by the Mesta Machine Co., of Pittsburg, at the company's plant at West Homestead, Pa. The lathe has two complete heads and two complete sets of housings, making it equal to the two-roll lathes doing work on short rolls. The lathe is built in all sizes from the smallest to the largest size in use.

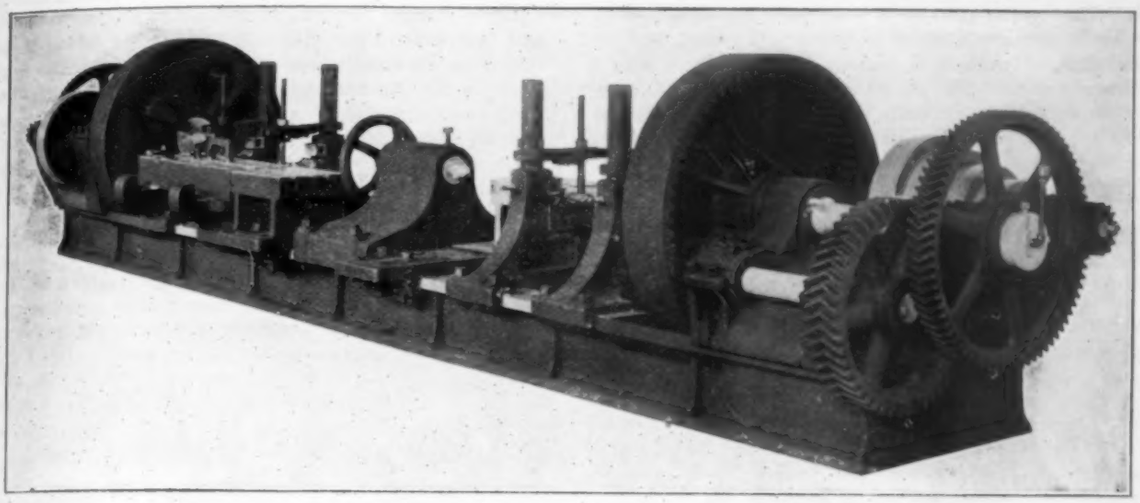


FIG. 1.—NEW DOUBLE-HEADED ROLL LATHE WITH MACHINE-MOLDED GEAR.

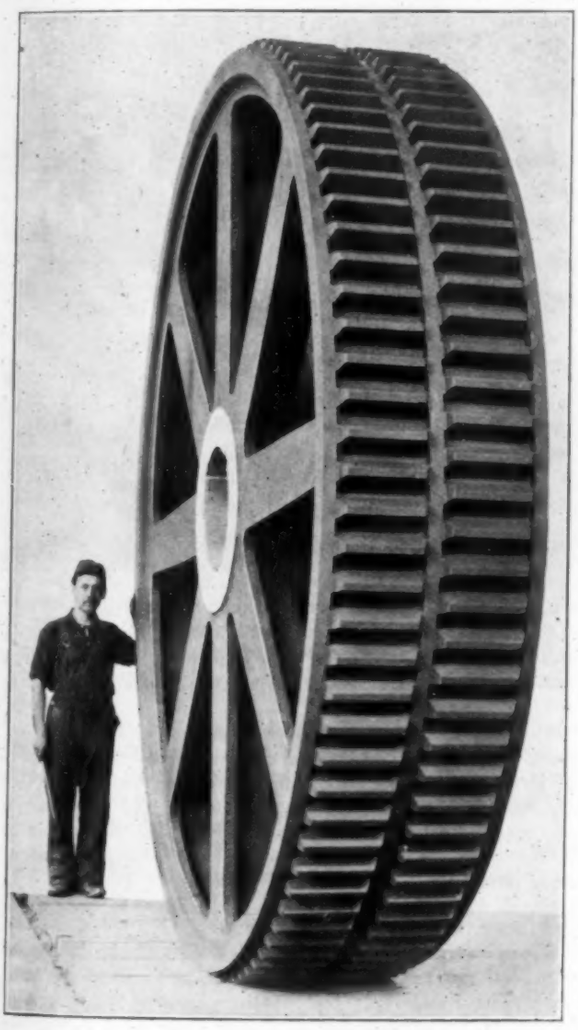


FIG. 2.—MACHINE-MOLDED OPEN-HEARTH STEEL GEAR WHEEL.

One of its features is the use of machine molded gears in its construction. The gears are made of open-hearth steel, the use of steel being very essential in gears for roll lathes. Machine molded gears have been found to be as accurate in use as machine cut gears and more accurate than pattern molded gears. It will also be noticed that the V shaped tooth is used which cannot be made by cutting, and is not absolutely true when made from patterns.

Many roll lathes on the market today have two sets of housings but both rolls are driven from one head stock, which makes it necessary for both roll turners to stop work when the one next to the head stock wishes to change rolls or stop work for any reason. The lathe shown permits both turners to operate independently. It can also be used for turning very long rolls by using only one head.

Fig. 2 represents a sample of work that can be done in machine molded gears. This wheel, which is 12 feet 3 inches in diameter and has a face of three feet, was made by the Mesta Machine Co. The wheel is of the step-tooth pattern and has three shrouds which extend up to the pitch line, thus greatly increasing the strength of the teeth. It is stated that this wheel could not be made by cutting, as it is impossible to cut wheels with shrouds.

Additional advantages claimed for the machine molded gear over both the cut and pattern gears are that the method of molding puts a hard, smooth shell on the teeth, almost equal to a chill, thus greatly prolonging the life and use of the teeth. The cutting of gears removes this shell on the original casting, while with pattern molded gears it is considered impracticable to produce this shell. In addition the cost of the machine molded gear is much less than the cut gear, and while a trifle higher than the pattern gear is more accurate than the latter.

The gear wheel shown, which is one of the largest yet made from machine molds, is of open-hearth steel and will be used for gearing a Corliss engine to a rolling mill.

The Sharon Coke Co.

The Sharon Coke Co., the fuel end of the Sharon (Pa.) Steel Co., has purchased 1,300 acres of coal in the Masontown district. The tract lies in German township, and the seam is nine feet thick. The coal is the same as that used by the other large steel concerns for coke making. The price was over $600,000. Two shafts are being put down and shipments of coal will be made over the Brown's Run branch of the Pennsylvania to Sharon, where a by-product plant will be built adjoining the blast furnace. The company has also purchased chased 200 acres of surface in case it may be found more desirable to coke the coal where it is mined.

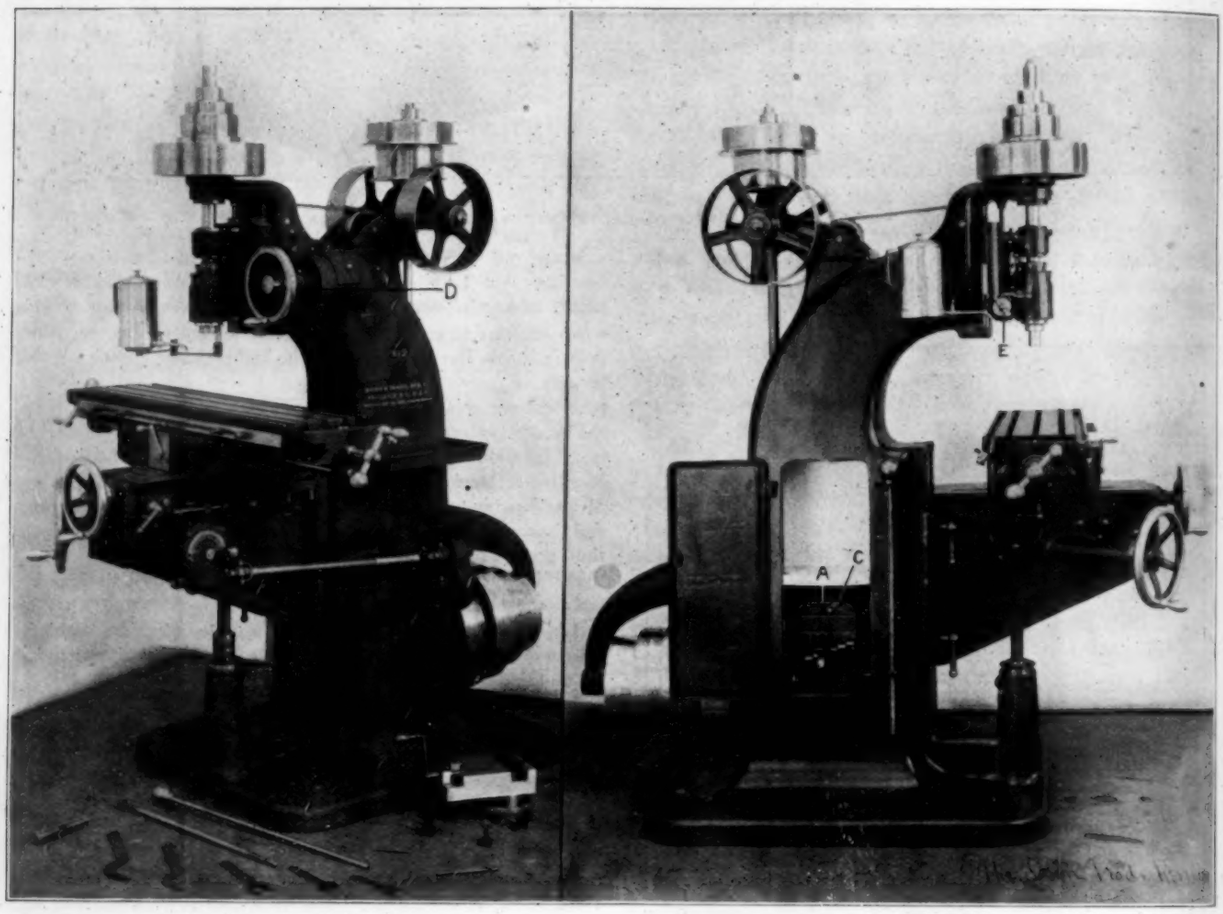
The Jackson Iron & Steel Co. has been incorporated with a capital stock of $300,000, and will erect a tin plate mill at Clarksburg, W. Va. When finished the plant will contain 14 mills. Contracts for machinery have been placed and the erection of buildings will begin at once. The officers of the company are: T. Moore Jackson, president; W. I. Grove, secretary; C. C. Moore, general manager.

NEW VERTICAL SPINDLE MILLING MACHINE.

This machine is a recent production of the Brown & Sharpe Mfg. Co., Providence, R. I., and was first publicly shown at the Buffalo Exposition. A brief account of its special features was given by our staff correspondent in our issue of Aug. 22 and we are now able to illustrate it more fully. This type of machine is being more appreciated as the peculiar advantages it offers are better understood, and for many kinds of work it is preferable to a machine with a horizontal spindle. The use of a machine of this type permits the operator more easily to see the work, and readily follow any irregularity in the outline, as in profiling, cutting irregular slots in a surface and work of a similar character. All levers, hand wheels, etc., for controlling the various movements of the machine are conveniently placed, thus enabling adjustments to be quickly made.

Fig. 1 shows the table feed mechanism and the fine hand feed for the spindle. Fig. 2 illustrates the feed index and the micrometer stop. The knee screw is of improved design. It is of the well-known telescopic form and does not pass below the base of the machine. The table is at different heights in the two views and the action of the telescopic screw is clearly indicated by the illustrations. The feeding mechanism for the table, shown at A, is new in design; the various changes being easily and quickly made by the simple movement of the hand lever B. The vertical shaft, at the rear of the machine, which drives the mechanism is driven by a belt running from the spindle pulley; the main spindle belt riding on the same surface. The lower cone of the gears is driven from this shaft through bevel and spur gears. The upper cone of six gears, behind the index plate, is driven through an intermediate gear held by a yoke at the lower end of the controlling lever B. To change this feed, it is only necessary to unlatch the lever and slide it along to the position plainly indicated on the index plate and lock it into place under the desired feed number. The feed is carried from this mechanism through spur gears and a universal joint to the table. The table feed is driven by an auxiliary shaft, thus doing away with the necessity of a spline in the feed screw.

The small lever C at the top of the index plate is for quickly changing the feed from fast to slow, or vice versa. This controls a clutch that engages gears on the shaft driving the universal joint, thus making it possible to obtain twelve different changes of feed; from 0.005 inch to 0.125 inch to each revolution of the spindle. The fine hand feed and quick return for the spindle head are operated by one hand wheel, shown at D. The fine feed of 0.052 inch per revolution of the hand wheel is obtained by a system of differential gearing; and is engaged, and disengaged, by the simple movement of a knob on the front end of the shaft. This is a most simple and novel feature, and often enables the machine to be used as a drill press for work already in position for milling. The micrometer adjustment, shown at E, serves to control the depth of the cut. It is graduated to read to thousandths of an inch. Another important feature of this machine is that the spindle pulleys run on phosphor bronze sleeves and not directly upon the spindle, thus relieving the latter of any strain due to the pull of the belt.



NEW VERTICAL SPINDLE MILLING MACHINE OF BROWN & SHARPE MFG. CO.

The main dimensions of the machine are as follows: No. 10 taper hole in spindle; four inch vertical movement to head; 16 inches from center of spindle to column; working surface of table, 37½ inches x 10 inches, transverse feed of 12 inches, and longitudinal feed 26 inches. The table can be lowered 16 inches from the end of spindle. The net weight is about 2,800 pounds.

The Knapp Supply Co. of Union City, Ind., jobber of plumbers' gas and water supplies, reports an excellent business. The business is one of the oldest in that section, having been established over 29 years ago, and is steadily growing. The officers of the company are: W. K. Smith, president; S. R. Bell, vice-president; L. C. Huesmann, secretary, treasurer and manager.

THE LACKAWANNA STEEL PLANT AT BUFFALO.

(Special correspondence.)

BUFFALO, N. Y., Sept. 16.—It is now less than two years since the construction of the $25,000,000 steel plant of the Lackawanna Iron & Steel Co. at Stony Point, on the shore of Lake Erie, immediately adjoining Buffalo, was begun. It has been said all along that it never will become a reality as an independent power in the steel world; there are a few wiseacres who are still predicting that the project never will be consummated; that the steel corporation will swallow it up before it reaches maturity. The fact remains, however, that the Lackawanna Iron & Steel Co. has gone right ahead with its work of construction and has made progress which its engineers say is satisfactory to them. Briefly to describe the present stage of construction: the company has erected ten substantial buildings, most of which are complete and the others very near to completion; has laid the foundations for several others; has several shops in operation; is making patterns and storing supplies; has nearly finished one large blast furnace and is at work on another of corresponding size; has built the bases for the furnace stoves; has already a considerable quantity of machinery installed and at work and is daily receiving more; has begun the dredging of a large ship-canal; is well started on a large tunnel across and beneath the canal, and has finished a railroad connecting line.

The buildings already erected cover several acres. The company has acquired a strip of land with about three miles of frontage on the lake and it is stated that the buildings of the plant, when it is completed, will stretch over a shore line of one and one-half miles. One firm of building contractors has work which it is expected will require three more years to complete. The buildings already finished or almost finished are the following:

A four-story brick and stone office building, 100 x 125 feet, wherein a corps of engineers and architects are at work on the details of the plans that have not yet been executed. This is one of the handsomest and most complete office buildings connected with any steel works in the country.

A machine shop, 300 x 80 and 50 feet high, wherein the largest electric traveling cranes in or near Buffalo are being operated by electricity in the work of installing the ponderous hammers and other heavy machinery that the company will use to make its own tools and do all its own repairing. There are four of these cranes, two with a lifting capacity of 30 tons and two of 20 tons.

A boiler shop, 300 x 80 and 30 feet high, where great punches, cutters and riveters are now in operation, making the boilers and doing much of the plate work to be used in the plant.

A foundry, 500 x 80 and 50 feet high—the largest in this section. The iron skeleton of this building is finished and the brick walls are being laid. It is expected the structure will be ready for use about Oct. 1. Special effort is being made to get it into running order at the earliest possible date, as in the foundry and machine shop the company will make its own machinery for future use. All the castings to be used in the rail mill, which is to be largest of all the buildings, will be made in the foundry.

The foundry is on one side of the machine shop. On the other side is to be the blacksmith shop. The foundation and skeleton of this building are finished. Eighty blacksmiths are to be employed here.

A pattern shop, 50 x 100 feet, two stories high is finished, and patterns for some of the castings that are to be made in the foundry are now being turned out.

A store house for patterns, 50 x 100 feet, four stories high, is next to the pattern shop.

A power house, 30 x 50 feet, one story high. In this building are an 800-h. p. engine and two 200-h. p. dynamos. These are supplying power to the machinery now in operation. Later a large power house is to be built and to contain at least twelve dynamos, as the machinery of the entire plant is to be run by electricity.

A carpenter shop, 50 x 100 feet, two stories high, in which planers, circular saws, morticers and other machines are now running, turning out what wood work is needed in the various buildings under construction.

A supply shop, 50 x 100 feet, one story high. This building contains an elaborate system of racks, shelves, lockers, etc., in which supplies of hardware, paints and other articles of various kinds are being packed for future use.

The foundations for several other buildings have been laid. All the structures mentioned are of steel frame and brick walls and are on concrete bases.

Over 800 men are now employed and have been since last spring in the work of constructing the plant. It is stated that nearly 10,000 operatives will be employed when the plant is finished.

Hingston & Wood, a Buffalo firm, which has a $700,000 dredging contract with the company, last week began the construction of a canal 200 feet wide and about a mile long, which is to enable ore-laden vessels from Lake Superior to deliver their cargoes at convenient points within the grounds. It will be sufficiently deep for the largest freighters.

Work on the tunnel, which is to run across and under this canal, from the pumping station and the coking plant to the blast furnaces and carry the gaspipes, steampipes and electric wires, is progressing rapidly. Gases from the retort coke ovens will be conveyed through this tunnel for the driving of gas engines at the furnaces. The shaft at each end is 90 feet deep and the length of the tunnel will be 400 feet.

A short line of steam railway which is to connect the plant with the Delaware, Lackawanna & Western Railroad at South Buffalo, was finished a few days ago.

Steel products of various kinds will be manufactured at the Stony Point plant. Steel rails will be the principal product. The company is keeping details of its plans, but it is said by outside engineers that the company expects to begin steel manufacture next spring or summer. It is expected that ultimately plates and bars will be among the products of the company, and possibly rods and wire. The supplying of steel to various finishing plants under term contracts, leading to the building up of a variety of industries in the Buffalo district, is a probable development.

Among Cincinnati Machine Shops.

The combination of large laundry machinery plants of the country into the American Laundry Machinery Manufacturing Co. will result in the erection in Cincinnati of a large plant to take the place of the present plants of the American Laundry Machinery Co. and the F. M. Watkins Co., both in Cincinnati. The new plant will be one of the largest of the six plants that will take the place of the 11 concerns that are bought by the company. A location has not as yet been selected.

The Triumph Electric Co., of Cincinnati, has about concluded to move into larger quarters and will probably build a new shop next year. The concern is cramped for room and officials of the company say that a larger plant is imperative.

The Miller, Du Brul & Peters Mfg. Co. will soon begin the erection of a large addition to its plant in Cincinnati. The company owns 55 feet of ground adjoining the present factory building on Pearl street, and will build on it a six-story building nearly uniform with the six-story structure now fronting 81 feet on Pearl street and extending back 100 feet. The company will equip the new addition as a machine shop with medium weight lathes, drills, planers and the like for their business of manufacturing cigar mold machinery.

The Herring-Hall-Marvin Safe Co. of Hamilton, O., has placed an order with the Bullock Electric Manufacturing Co. of Cincinnati, for a 60-kilowatt motor, which is to be run by a 90-horse power direct connected Buckeye engine. The Buckeye Engine Co. has also been given an order for a 235-horse power engine, for two 75-kilowatt direct connected motors to be put into the electric light and power plant of the National Soldiers' Home at Dayton, O., by the Thresher Electric Co.

The Buffalo Forge Co. of Buffalo, N. Y., has been incorporated with a capital stock of $1,000,000, by W. F. Wendt, H. W. Wendt and Elizabeth Wendt, all of Buffalo, are the incorporators. The company has been doing business for many years and is well known as a large manufacturer of forges and heating and ventilating devices.

THE NEW BRITISH WESTINGHOUSE WORKS.

English exchanges give some details of the new works of the British Westinghouse Electric & Mfg. Co., Ltd., of which the corner stone was laid a few weeks ago at Trafford Park, Manchester, Eng.

The new works, which will be the largest devoted to the electrical industry in Great Britain, will be completed in a few months' time. They will give employment to some 5,000 British hands in the manufacture of the well known Westinghouse electrical apparatus and engines. Americans will control the business during the first few months whey they will be succeeded by English engineers. The company has sought out among the British colleges and technical institutions a number of the leading engineering students, and sent them to the Westinghouse works at Pittsburg, where they will remain until they have gained sufficient experience in the construction of the Westinghouse specialties to enable them to act as leading hands at the new works on their return.

The site, covering about 130 acres, is in close proximity to the Ship Canal, the Bridgewater Canal, and the main line railways. Shipping facilities for all parts of the world are thus provided. Fuel and raw material will be brought in cheaply and rapidly. At the present time some 27 miles of railway track are laid about the ground for the distribution of the great quantity of building materials required. In all, there are some 15,000 tons of steel and 10,000,000 cubic feet of timber required on the buildings. About 3,000 workmen are busily engaged in pushing the work rapidly forward to completion.

The works proper are located in six buildings, each one being of proportionate size and adapted for one particular branch of manufacture. They are all of rectangular form, and arranged side by side in the order most convenient for securing straightforward work in the manufacture of the machinery from the raw materials to the highly finished product. Taking the buildings in order—on the extreme east is the iron foundry, 170 feet wide and 580 feet long, where plant will be installed capable of turning out and handling the huge castings required in the largest sizes of electric power machinery. Next to the iron foundry come the smaller brass foundry, malleable iron foundry, pattern shop, steel foundry, and forge. The two last are built end to end, forming a building 170 feet wide by 580 feet long. The next building is the machine shop, probably much larger than any other engineering shop in the United Kingdom. It is 430 feet wide by 900 feet long, and will be equipped with the most modern machine tools, large and small, all electrically operated. It is divided longitudinally into bays. The side bays are arranged with two stories, and are arranged for the machining and finishing of the smaller parts of machinery; the centre bay is arranged for the machining of large parts, and the erection of the largest manufactured equipment. The most up-to-date methods will be adopted in all departments; electric cranes of all types are to be placed wherever required. Two overhead crane tracks run along the front of the buildings from the iron foundry right through to the machine shop, the cranes having a lifting capacity of 50 tons. Two smaller cranes run the full length of the machine shop building, between it and the forge and the steel foundry. The foundry and machine shop are to be fitted with cranes capable of handling and conveying the largest machine parts to the various sections of the works, the works machinery being so arranged that, as far as possible, each unit, be it dynamo, motor, or engine, passes continuously, step by step, through the different sections, entering the forge, and leaving the machine shop a finished product ready for delivery. The matter of delivery also is as simple as possible. Railway tracks in direct communication with the main railway lines enter and run the full length of the shops. The machinery will follow very closely the principles adopted in the works of the Westinghouse Electric & Mfg. Co., Pittsburg.

In addition to the six buildings mentioned, there are two others—one the office building, 50 feet wide by 250 feet long, set in front of the machine shop; and the other, box factory and stores, 60 feet wide by 270 feet long. The office building will be of imposing appearance, and will accommodate the clerical staff, shipping department, drawing offices, and also have certain fireproof departments in which the work records will be kept.

Efficient heating and ventilation arrangements will be provided, and all conveniences, such as lockers, lavatories, &c., will be numerous and of the most modern types. Not only in the works will the workman be well dealt with, but, if he wishes, he may rent a house built purposely for him adjacent to the works. These houses will be of modern construction, and will be supplied from the works centre with electricity, and gas for heating purposes. Arrangements are also being made for the erection of some better class cottages for the use of foremen, for the erection of a large hotel to accommodate commercial travelers, etc.; also schools, clubs, and recreation grounds.

THE CASKEY PORTABLE PNEUMATIC PUNCH.

A new portable punch, manufactured in four sizes, and adapted to work on plates up to three-quarters of an inch thick, is the invention of S. S. Caskey and is manufactured by F. F. Slocomb & Co., Wilmington, Del. The tool was designed by a machine-shop superintendent and has been given a thorough trial in order to develop any latent possibilities that could only be properly brought out in actual use. A number of the punches are now in successful operation in various shipyards, car shops, etc. It is claimed that by the use of this punch one man can do the same amount of work

THE CASKEY PUNCH.

that could be done by a gang of men with the ordinary power punch. The pneumatic punch has special advantages, including accuracy of work as it is easier to move it to the exact mark than to swing the plate in the jaws of the old style punch. There is also a saving of space, and this feature, in connection with the portability, adapts it for use on board ships, for manhole cutting on boilers, for stack and tank work, etc., and for use in the field.

The tool is quite simple in construction as may be seen by reference to the illustration, and this characteristic gives it great durability. The chief distinctive feature is a hollow piston, containing oil, and a stationary tube is arranged to telescope through a prolongation of the piston, the oil being thereby forced into and through the tube and thence upon the plunger, where it exerts the accumulated pressure. The air which drives the piston during the stroke is utilized to drive it back and is finally expelled through the exhaust during the succeeding stroke. This affects an important saving in the amount of air used.

The stockholders of the American Steel Refining Co., Cincinnati, O., have elected A. Reudepohler president and Al. Eisenheimer, secretary. The company is experimenting with a steel refining process at the Otto coke plant, north of Cincinnati, using gas from the coke plant.

THE PHOTOGRAPHY OF MACHINERY, DRAWINGS AND BLUE PRINTS.

The *Photogram* has an article upon the use of the camera in the machine shop and several suggestions are made that are worthy of consideration by the numerous firms who have adopted photography as a useful aid in following the progress of work under way, keeping a convenient record of experimental construction, or as a preliminary to catalogue illustration.

Many things often conspire to make the photographing of machinery a matter of difficulty. Among these are the subject itself, its situation and the urgency of the work. I will take these and other points in order, and hope to give some practical hints, which will, of course, have been arrived at by the man who has had much experience in this work, but may save the beginner—amateur or professional—from many failures.

A machine or engine ought to be photographed when it has received the coating of "gray filling," which precedes the final paint. This gives a matte surface of a neutral or bluish-gray, and saves no end of annoyance in the matter of reflections which frequently appear in the varnished surface. If the machine in this state is not available, something can be done by dabbing over the painted parts with putty. Care should be taken, too, in arranging the machine away from objects which can form reflections in its polished surface. Unfortunately, it usually happens that it must be taken where it is or not at all; but even in this case it is often possible to rig up dark screens around it.

Bright steel parts should always be painted. Some prefer a species of whitewash which is rubbed off afterwards with a cloth. Better is a mixture of white lead and turpentine (of the consistency of thin cream), enough lamp-black being added to dull the brilliancy of the white, and then one-third (in bulk) of gold size to give adhesion to the mixture. After use, a rag dipped in turpentine removes the coating.

Now as to lighting. This, unfortunately again, has generally to be made the best of. We must aim at a rather low front lighting. Top light, owing to its casting heavy shadows, is bad; details are hidden in underlying parts of the machine, and detail, microscopically sharp, is what is wanted in negatives of these subjects. The engineer wants every nut and bolt to show. Therefore the tendency—of both indoor and outdoor lighting—to give too much light must be counteracted. Much good can be done with reflectors. A white sheet, wood covered with tinfoil, or, for large subjects out of doors, sawdust or white sand strewn on the ground around the machine, are some of many efficient means.

Artificial light also is useful. A thin line of flash powder laid near, around the subject, but not so near as to come into the field of view, is a help that can be adjusted to any extent.

Some few details connected with taking the picture fail to be mentioned. It is often well to lower the camera within a few inches of the ground, thus getting details in the lower shadowed portions. Lettering is sometimes a difficulty. Letters cast in intaglio on the machine may, if not plain enough, be filled up with a paste of whiting and water. The prominence thus given to the firm's name is a point which they will appreciate.

As regards background, it is hopeless, I am afraid, to expect to get such a white and even background that no blocking-out need be done on the negative. But it is sometimes an advantage to reduce as far as possible the marks and dirt sure to be found on any background extemporized in engineering works. To do this, keep the background gently moving during exposure. Some object should figure in the print whereby an idea may be obtained of the size of the machine—say, a 1-foot rule in the case of small machines, and a man (who, by the way, should be engaged in looking after the machine, and not in staring at the camera) in the case of larger engines.

Exposure, it need not be said, should be full, and development commenced with a weak solution to get detail everywhere, and just enough density obtained afterwards to give a lucky print. Too great density makes blocking-out more difficult. In any case, this is—except to the draftsman—the worst part of the process, but it is absolutely essential for commercial purposes, such as catalogue illustration, etc. To become expert is simply a matter of practice; but here are one or two hints: Avoid touching the film before blocking out, for any patches of grease from the fingers may make it almost impossible to outline neatly with brush and pencil. Use Indian ink—ground by yourself to an absolutely dense black fluid, free from brownness when viewed in the dish—for the outline, and fill in larger areas with a good mixture like Photopake. Place the negative on a retouching desk, with a mirror below to give a strong illumination through the negative. At night an incandescent electric lamp fixed to a stand which can be moved about under the negative is quite the best thing. Rule straight lines, such as the top of a boiler, with the drawing pen, and also go round other parts with a long "duck" sable-hair pencil well charged with color. A steady and confident hand is a *sine qua non*—if you feel at all shaky or nervous, better leave this part of the business alone.

A correspondent makes a suggestion, in the columns of the *American Machinist*, that may be read to advantage in connection with the above article. The letter, signed F. O. Tographer, follows:

"A great deal of photographing of machinery is done by men who do not devote their whole time to photography by any means, and many of your readers will no doubt be glad to know of a new method of developing plates that will enable them to make good negatives from plates that are either greatly under or greatly over exposed. I have used it with complete success in cases when the ordinary method would certainly have utterly failed, and I believe it is a very great advantage to use it in all cases. I have never tried it for machinery, but believe it would be especially advantageous for it. The new method which is now being used by some of the most skilful amateurs is, to place the plate in a first bath composed of 7 drams Ortol A; 1 dram Ortol B to 10 ounces cold water. Let the plate remain in this solution about four minutes, then put immediately into bath composed of 7 drams Ortol B; 1 dram Ortol A to 10 ounces cold water, and develop to the required density; then place the plate in the required bath of hypo until perfectly clear, wash in cold water, and dry. The first bath gives the plate density, the second develops it; and unless a plate be very much over exposed, it should show nothing in the first, but come up immediately in second. If, when the plate is partly developed, more density is needed, place it for a minute in the first bath, then proceed with the dveloping. Should it show anything in the first bath, remove immediately to the second. By this method a good negative can be made of almost any exposure; that is to say, if there is anything there, the best will come out, and the plate will be evenly developed—not black in one place and very light in another, nor *vice versa*."

A method of photographing drawings and blue prints, together with some hints as to the procedure necessary to make the process successful is briefly outlined in a recent issue of *Machinery*. It is described as follows:

"This process consists in suspending from the ceiling a frame which holds a camera, two electric arc lights and a board upon which the drawing is pinned. The object of suspending the apparatus is to avoid the vibrations of the building due to modern machinery or the slamming of doors. The photograph may be taken by night or day. The lens must be capable of copying straight lines without the least diffusion or aberration. The usual photographic dry plate is too 'soft;' plates which will yield very dense black negatives are required. 'Process' plates suitable for this work can be had from almost any dealer for about $3.80 per dozen for the 10x12 size, and a drawing of 25x30 inches may be reduced to the 10x12 size and still have all the figures legible. Process plates dry very quickly. The photographic process makes dark lines on a light ground. There may be a little difficulty experienced in copying blue prints owing to the fact that blue is the most actinic color. Blue 'takes light' and so gives very little contrast. This difficulty may be overcome by saturating a swab of cotton with ammonia and holding it near the blue print. The fumes of ammonia will cause the print to turn dark purple, which will photograph well, that is to say, it will not photograph at all, but will permit the white lines to appear in strong contrast.

"Almost any kind of printing paper may be used. The familiar blue print paper yields dark blue lines on a white ground. 'Maduro' paper (Keuffel & Esser Co., N. Y.) gives dark brown lines on a white ground. The best paper for copying line drawings is 'Velox,' which may be had from all photo dealers. This gives jet black lines on a pure white ground, even reproducing the slight gloss of the ink. This photographic process is advocated for several reasons. One advantage is that prints of this character are said to be far superior to half-tone engravings and for a limited edition, say for catalogues, are much cheaper."

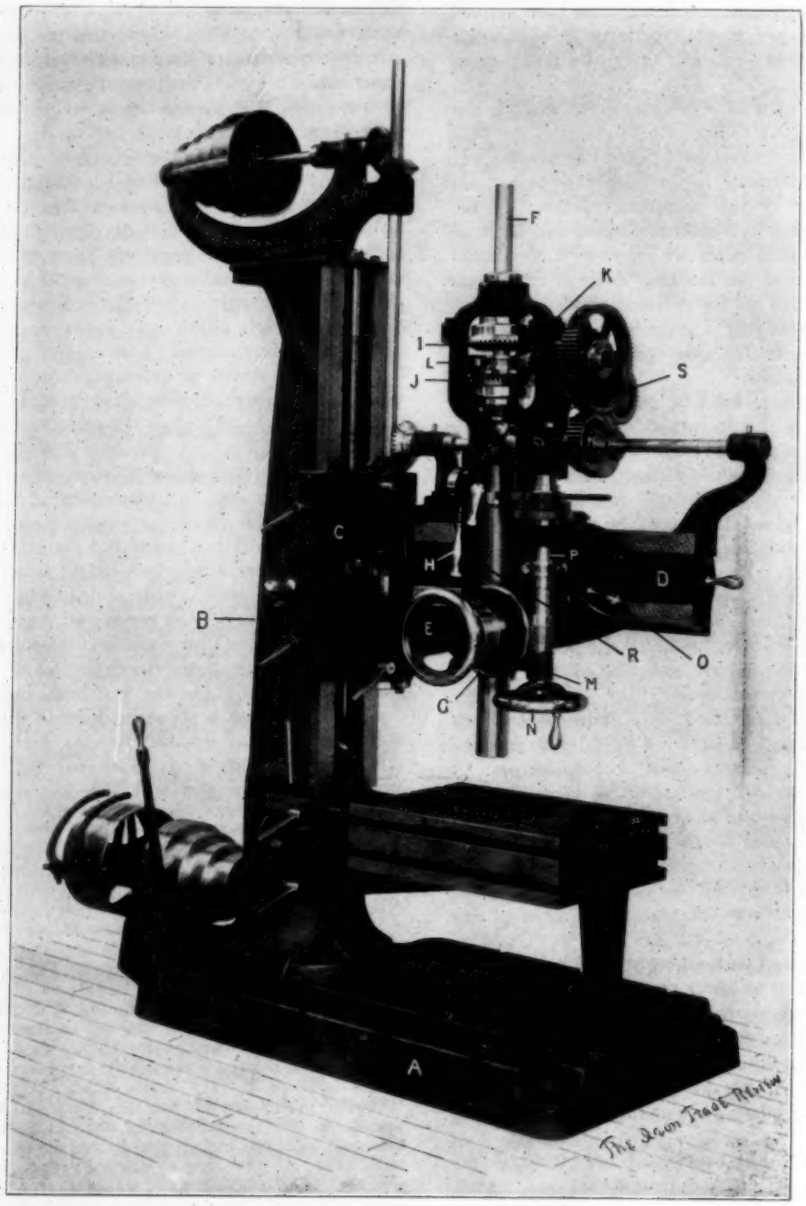
A NEW RADIAL DRILL.

The Fosdick & Holloway Machine Tool Co. of Cincinnati, has designed a radial drill under the patent recently issued to its superintendent, William Herman. A view of the complete machine is given in the accompanying half-tone and the general arrangement may be followed with the aid of the reference letters on the illustration. The bedplate A supports the vertical column B in the usual manner; and there is a crosshead C connected to the arm D by means of suitable trunnions. A saddle E slides on the radial arm carrying the drill spindle and the feed mechanism.

Power is delivered to the countershaft at the top of the column B and transmitted thence by bevel gears (one of the latter having a slot and feather connection with the shaft) to a vertical shaft extending downward through the trunnions of the crosshead and the arm D: another pair of bevel gears delivers the power to a horizontal countershaft carried in bearings on the arm D. The saddle E is extended into a yoke through which the drill spindle F has its upper bearing.

The means for producing and changing the rotary motion of the drill spindle in either direction are carried directly on the spindle itself. Two oppositely placed bevel gears I and J are carried at the inner sides of the yoke, upon sleeves having a bearing in the yoke frame, and are driven constantly in opposite directions by a bevel pinion K. The corresponding faces of the bevel gears I and J are countersunk to receive expansion ring enlargements of the sleeves and between the gears is a sliding clutch L splined to the drill spindle and provided with wedges to spread the expansion rings on the sleeves. This clutch is operated by a sliding rod, and a rack and pinion device, by means of the hand lever H. The general effect of the friction gear is to start the spindle in either direction without shock or jar, yet with instant rapidity of motion, due to the location of the device directly on the drill spindle whereby all lost motion of the intervening parts is avoided. It also results in the location of the operating lever H directly alongside of the spindle itself in convenient reach of the operator who may therefore control all the movements without removing his eye from the drill at work. The power devices for raising and lowering the spindle F are as follows: A worm wheel G has an enlarged hub at one side countersunk for the reception of an expansion ring operated by wedgeshaped projections on the lever R. The latter is also arranged to engage at the will of the operator with a fixed collar on the shaft so that the lever, when it has disengaged the expansion ring, also serves to rotate the shaft by hand, and the spindle F may be quickly raised or lower and at any point instantly connected with the worm wheel G.

The hand wheel M is attached to a shaft passing through the sleeve bearing the worm wheel G, provided with a spur pinion engaging a rack on the arm D, by which means the



NEW RADIAL DRILL OF FOSDICK & HOLLOWAY MACHINE TOOL CO.

entire drill carrier E may be moved radially in or out. The worm wheel G is driven by a spur gear, on the spindle E, meshing through intermediate idler gears with three spur gears of different diameters carried at the upper end of the worm shaft P. These gears run loosely on the shaft P except as connected by the following mechanism: the shaft P is hollow through the upper part of its length and carries an internal rod with a cross key projecting through a slot in the shaft and beyond into engagement with one or other of the gears, according to the degree of elevation of the rod. The central gear is a trifle wider than the key and has one or more key slots; the upper and lower gears have each a counterbore next to the central gear (allowing a certain amount of play to the key without engagement) and have key slots. The key and rod are adjusted by the handle O and by means of the neutral position on each side of the central gear the power feed may be stopped at pleasure and the spindle fed by the hand wheel N.

The speed of the drill is varied by a rocker arm S acting upon the gears seen at the right of the yoke. These can be changed while the machine is in motion and, like the rest of the changes, are within reach of the attendant from his working position.

REPUBLIC IRON & STEEL CO.

The annual meeting of the Republic Iron & Steel Co. was held on Wednesday, Sept. 11. Three new directors were elected: Wm. Nelson Page, E. N. Ohl and Wm. B. Ridgely. The following directors retired: Myron C. Wick, Geo. M. Bard, L. E. Cochran, James C. Corns. No successor was elected to fill the vacancy caused by the resignation of Geo. D. Wick or by the death of T. A. Meysenburg.

Alexis W. Thompson was elected president to succeed R. S. Warner, resigned; John F. Taylor, Archibald W. Houston, Wm. E. Taylor, Wm. Barret Ridgely, vice-presidents; John F. Taylor, treasurer; Y. B. Haagsma, secretary. The executive committee consists of G. Watson French, chairman, Alexis W. Thompson, John F. Taylor, Harry Rubens, Wm. E. Taylor. The board of directors are August Belmont, G. Watson French, W. H. Hassinger, Archibald W. Houston, Peter L. Kimberly, Edwin L. Ohl, Wm. Nelson Page, Wm. Barret Ridgely, Harry Rubens, Grant B. Schley, Geo. R. Sheldon, John F. Taylor, Wm. E. Taylor, Alexis W. Thompson, Randolph S. Warner.

The report presented covers the fiscal year ending June 30, 1901. While it shows a very considerable reduction in profits, as compared with the report for the 14 months ending June 30, 1900, it is to be considered that the loss of surplus resulting from the year's operations was not due to causes indicating a permanent crippling of earning power. Much money has been spent for betterments and the plants of the company are now in better condition to produce economically than at any time. The Southern properties in particular are a valuable asset; and the Youngstown steel plant, with the addition of the billet mill gives the company a capacity of 1,000 tons of steel billets a day. The balance sheet as of June 30 shows as its main changes an increase of $1,164,175 for new construction, materials and supplies drawn down in value $803,880, and accounts and bills receivable reduced by $481,776. Holdings of stock in sundry companies have decreased $400,000 to a total of $147,200. On the other hand, bills and accounts payable have increased $661,443. The fact that the company's mills were idle through July and August and a good portion of September, 1900, pending the settlement of the wage scale, and that owing to this condition and the very low prices of bars in the late summer of that year, very little business was booked, explains in part the decrease in earnings. The outlook today is much improved; prices are remunerative and the mills are fully employed. The general balance sheet as of June 30 compares as follows:

Assets—	1901.	1900.
Real estate, plants, machinery, etc	$41,093,724	$41,142,251
New construction	2,382,378	1,218,203
Stock in other companies	147,200	547,200
Northern blast furnace improvement	100,674	
New gas pipe lines, etc	245,171	116,730
Raw and finished materials	3,328,850	4,132,730
Accounts and bills receivable	2,527,209	3,008,968
Cash on hand	1,127,107	1,203,132
Totals	$50,952,315	$51,369,214

Liabilities—		
Preferred stock	$20,306,900	$20,306,900
Common stock	27,191,000	27,191,000
Current accounts payable	1,685,350	1,023,907
Dividend July 2, 1901	355,370	*355,370
Instalment on coal purchase	185,000	214,000
Reserve for taxes, etc	47,386	85,988
Reserve for bad collections	61,642	
Surplus	1,109,665	2,222,049
Totals	$50,952,315	$51,369,214

*1900.

The profit and loss account for the year ending June 30, as compared with the preceding year shows the following changes:

	1900.	1901.	Decrease
Net earnings	$5,684,101	$1,034,248	$4,649,853
Improvements etc.	2,040,372	725,149	1,315,223
Net profits	$3,643,729	$309,099	$3,334,630
Divs. on pf. stock, 7 p. c.	1,421,679	1,421,483	196
Balance	Sur.$2,222,050	def.$1,112,384	$3,334,434

President Warner's report comments as follows: "To improve the physical condition of our blast furnaces we were obliged to have them all out of blast during the first six months of the year. On account of this our pig iron production for this fiscal period was 175,186 tons less than for the previous 14 months' period. Our blast furnaces are now in first-class condition, and our annual output of pig iron will be increased to 50,000 tons or more. The increased tonnage and economy in manufacturing derived from these expenditures are now beginning to show results. On account of the long idleness at both the mills and furnaces and the reduction in tonnage produced of both finished material and pig iron during the first six months of this period, it took all of our earnings until April to absorb the fixed charges, repairs and general expenses. The repairs for the year and expenses while idle have both been absorbed in operating expenses. Many important improvements and renewals have been made during the year. All of our blast furnaces are now in first-class condition, and should run for two or three years without further extensive repairs. The new billet mill, which we are adding to our Bessemer plant at Youngstown, Ohio, is practically completed, and will increase our output of billets to 1,000 tons or more a day. The new blast furnace at Thomas, Ala., will also be blown in shortly. Our labor matters for the year have been amicably settled. We have a large tonnage of material sold, and the outlook for the company is very encouraging. The changes that have taken place in the iron and steel world during the last few months should insure more stable prices, and thereby inure to the benefit of the business."

Further Enlargement of Monessen Tin Plate Plant.

The American Tin Plate Co. is proceeding with its plans to further enlarge the tin plate plant at Monessen, Pa., which now contains 12 hot mills. At the time the combination was formed the plant had eight mills completed with four under contemplation, one of which was partly built. This was completed at once and the other three later. The first addition will be of the six mills just being removed from the Canal Dover plant, which is to be entirely dismantled, and another six may be brought from Cambridge, O. Contracts for the additional buildings have been let to the American Bridge Co. The Bass Foundry & Machine Co., Ft. Wayne, Ind., has a contract for a 1,500-h. p. engine. If the entire 12 hot mills are added the number of cold mills will be increased from 10 to 20.

The enlargement of the Monessen plant is the direct result of the refusal of the workmen there to go out on strike. As is known, the system of working at Monessen is different from the regular style, the mills being arranged in groups, each stand of rolls being devoted to a particular work and the men thus acquire particular skill in their respective branches. The furnaces are also arranged so that they are not charged and withdrawn from at the same time, making the heating easier and more regular.

Geo. H. Bowler, Williamson Building, Cleveland, has bought out the machinery of the North Milwaukee factory of the American Bicycle Co., and will put it on the market.

TRADE PUBLICATIONS.

Nos. 5 and 6, Ryerson's Technical Library, have been sent out by Jos. T. Ryerson & Son, Chicago. No. 5 takes up the subject of boiler bracing and embodies information of value to boiler makers. It also contains a series of diagrams showing the head bracing and flue spacing, of standard tubular boilers, recommended by the Hartford Steam Boiler Inspection & Insurance Co. No. 6 is devoted to "Little Giant" pneumatic drills, hammers, etc. Part I. has a description of the drills and directions for their use. Part II. contains illustrated descriptions of "Little Giant" hammers, including the new long stroke tool. Part III. is an extract from a paper on pneumatic drills and hammers by Ewart C. Amos, a member of the Institution of Mechanical Engineers, London, England, read before that body in March, 1900. These publications are sent free to the trade.

The Brown & Sharpe Mfg. Co., Providence, R. I., has designed a line of spring calipers, spring dividers and firm-joint calipers. This is an entirely new departure for the firm and the tools exhibit all the characteristics of B. & S. workmanship. Two circulars are being sent out (one 6 x 9, the other 3½ x 5¾) detailing the good points of these tools. In regard to the spring caliper we learn the spring is stiff with convex ends that fit into concave grooves milled in the ends of the legs; this construction insures rigidity and prevents the spring of the legs sideways. The spring nut is entirely new in design, and constructed on the principle of the spring chuck, with the jaws carefully hardened. It is positive in action when closing, the thread engaging the screw on the slightest pressure, while the withdrawal of the pressure causes the nut to release at once and slide freely on the screw. It is dust proof, and combines all the advantages of the solid nut with that of quick adjustment. The legs are dropped steel forgings, with even taper, and every care is taken to have them uniformly finished, and the screw is of hardened steel. The outside spring calipers and spring dividers are made in five sizes from 2½ inches up to 6 inches, and the inside spring calipers from 3 to 6 inches in four sizes. Any of these may be obtained with spring or solid nut. The firm-joint calipers are made, either inside or outside, in a series of twelve sizes from 3 inches up to 24 inches.

An artistic specimen of illustrative and typographic skill is being distributed by the Jeffrey Manufacturing Co., Columbus, O. It is catalogue 18, treating upon the Jeffrey electric locomotives and other appliances, operated by electricity, for use in mines, steel works, smelters, factories, plantations and industrial establishments generally. The Jeffrey locomotives range in weight from two to twenty tons, are equipped with one, two or three motors, and both trolley and storage types are illustrated. No attempt has been made in the catalogue, however, to give detailed specifications nor to enlarge upon the advantages of using electric locomotives; these are questions to be settled by proper attention to individual demands and the Jeffrey Manufacturing Co. invite correspondence upon these points. Portable electric pumps, larrys for coke ovens fitted for underrunning trolley or third rail contract, transfer and truck cars, generators, motors, controllers, switchboards, drills, together with all the clamps, splicers, insulators and other equipment for trolley service, are fully illustrated.

A 9 x 9 catalogue is devoted to the machine tools, for working plates, bars and structural shapes, manufactured by the Hilles & Jones Co., Wilmington, Del. It contains twenty illustrations of new machines, modifications of standard designs and special attachments for punches and shears not shown in previous catalogues issued by this company. Some representative standard machine tools, selected from the main catalogue, are illustrated in the present publication. Punching and shearing machines are shown in a variety of forms, single or multiple punches, controlled by hand or foot gags, coping attachments, twin-table shears, bending or staightening machines, plate bending rolls and plate planers. The tools are shown belt-driven and connected direct to steam engines and electric motors. A list of punches, dies and couplings, with sizes and prices, is included; these are illustrated with half-tones.

The Harrison Safety Boiler Works, Philadelphia, describes the Cockrane feed-water heater in a 3½ x 6 circular. The construction and advantages of the Cochrane type of apparatus is thoroughly discussed, together with much interesting information in regard to the purification and heating of boiler feed water. This little pamphlet, with its brief details, is merely intended to invite attention: to those interested, the large descriptive catalogue (101 H) will be mailed on request.

Several small circulars have recently been mailed by the Geo. V. Cresson Co., manufacturers of power transmitting machinery, Philadelphia. These relate to the merits of the patent adjustable loose pulley arrangement, the all-wrought steel spit pulley and the Para-pneumatic pulley. The loose pulley device comprises a loose pulley supported on a sleeve which forms part of the hanger; on one end of the hub is a flange and on the tight pulley is a similar flange, between these two flanges is a rubber disc: to get the sleeve pulley in motion, it is pressed by means of the lever against the tight pulley and by frictional contact receives a rotary motion, simultaneously with this rotary motion the belt is shifted to the tight pulley, by the automatic shifting device and when the belt has passed to the tight pulley the loose pulley comes to rest. The starting and stopping of the loose pulley can be done at any distance from the machinery to be operated, by means of a suitably arranged cord. The all-wrought steel split pulley is now a familiar acquaintance in many shops; the circulars give the prices, table of hubs and bores, together with a comprehensive telegraph ciper for ordering. The Para-pneumatic pulley is made under the Newel patents and the circular contains many flattering testimonials, a list of users in several states and a price list.

The Brown Hoisting Machinery Co., Cleveland, has a new and enlarged edition of the tramrail and trolley circular: this is standard size, 6 x 9, illustrated with fine half-tones and line engravings of the "Brownhoist" overhead equipment. Hangers and bolts, switches and twin-tables, steel and cast iron trolleys, crane trolleys, Yale-Weston triplex chain blocks and electric power trolleys are shown with prices, dimensions, etc., and a partial list of users of overhead tramrails and trolleys.

The Deming Co., Salem, O., has issued catalogue F, descriptive of some new types of Deming pumps not shown in former editions. These pumps are of various types, piston, centrifugal (vertical and horizontal), belt-driven or operated by steam or gasoline engines and are for almost every imaginable pumping purpose. Many rules and tables relative to the capacity, power and speed of pumps are given with concise formulas that will probably be useful to manufacturers generally.

The Chicago Pneumatic Tool Co., Chicago, has gotten up a special 9 x 12 circular containing a dozen pages of admirable half-tones of pneumatic tools, drills, riveters, painting machines, wood-boring machines, holders and hammers. These are shown in actual shop use and the prospective purchaser may thereby gain a better knowledge of their usefulness in his work.

The American Sheet Steel Co., New York, has issued a 6 x 9 standard size catalogue, containing 64 pages. The work is well illustrated with fine half-tones of the plants at Vandergrift, McKeesport, Scottdale, Leechburg and Hyde Park, Pa.; Cambride, Niles, Piqua, Wellsville, Struthers, New Philadelphia, Canal Dover, Dresden, Canton and Dennison, O.; Muncie, Ind., and elsewhere. There are also a number of views of the different processes in the production of sheet steel, from the burning of charcoal to the warehouseing of the finished sheet. A series of half-tones is devoted to the brands and trade marks of the various makes and in addition to the tables of price lists, etc., there are some useful tabulations showing the thickness and weight of sheets, made to the United States standard gauge, number of corrugated sheets in one square (100 square feet), weight of corrugated sheets per square, etc. Copies may be obtained on application to the advertising department, Battery Park Building, New York.

We have received a 3½ x 6 circular of the friction sensitive drill press manufactured by the Knecht Brothers Co., Cincinnati, O. The driving mechanism consists of two cones and a friction roller. The power is transmitted from the lower cone to the friction roller, which transfers power to the upper or spindle cone. The speed of drill is increased or diminished instantly without stopping machine, or shifting belts, by simply sliding the frame upon which the friction roller is mounted. The tension can be increased in proportion to the size of the drill by turning a hand-adjusting nut.

HEAT TREATMENT OF STEEL.*

BY C. H. RISDALE, MIDDLESBROUGH, ENG.

Tubes.

These are generally made from slabs which are first rolled to strip—perhaps at a different works to the tube-maker's. The strip is reheated, bent approximately to the shape of the tube, and the lap formed, after which it is heated for a short time to good welding heat, drawn over the mandrel, and welded without a flux being employed. None of these preliminary reheatings need be very high, and it is obvious that where material is heated several times and finally subjected, whilst only thin, to a very high temperature, that great care is necessary throughout to avoid burning the nature out of the steel.

The writer has been told by a tube-maker of the highest standing that the furnaces at his works in which this final heating was received were often at a temperature of 1,800° C., and that one and a half minutes might be sufficient, whilst two minutes would spoil the steel; also that the temperature was constantly varied at the workmen's discretion, and there were generally several tubes in at once. Often steel receiving such treatment is not more than 3-16ths of an inch thick, and the work is done so rapidly as to be finished above critical temperature, resulting in the grain being coarsely crystalline, which is unfavorable for cold expansion tests. Such conditions, viewed in the light of all we know, seem very severe, and the writer cannot help thinking that whenever satisfactory results are not obtained, unless analysis shows the steel to be decidedly unsuitable, the cause should be unhesitatingly assigned to the treatment.

The precautions which seem to suggest themselves are: first, great attention to all the heatings to avoid the formation of scale and burning out of carbon from the surfaces to be welded, and unless the objections are insuperable the use of a flux, as this would admit of less heating and protect the steel; and secondly, that either work should be put on the material after it is below critical temperature (say at low red), or the tubes after cooling rapidly should be rapidly heated to cherry-red for a minute or two and allowed to cool naturally in air.

Plates.

The treatment these receive which may affect their properties are usually bending, pressing, or flanging, hot or cold, punching, shearing or piercing, and welding. All these may set up more or less severe strains, resulting from work at too low or too high temperature affecting parts only. Flanging by continued hand-hammering, either at a blue heat or cold, is particularly trying to the material.

All these strains may be removed by reheating rapidly to cherry-redness for a minute or two and allowing to cool naturally in air. When the makers know that plates thin enough to have much rolling hardness must stand any severe work, if they can finish them hotter, say at a good cherry-red (say, 800° to 900° C.), and let them cool slowly in masses, they would be able to supply them in a somewhat softer condition. The effect which the finishing temperature and the amount of work have on the hardness and toughness of a plate and on the tests it will stand are widely understood and can be largely controlled by regulating them.

Sheets, Black Plates and Tin Plates.

Much the same applies to these as to thin plates; being thinner, they tend to be finished colder, which, though often done intentionally to give them a better surface, results in greater rolling hardness. Hence for many purposes they are "annealed," the treatment generally consisting in packing them in large piles into boxes which are intended to exclude the air from them whilst they are heated (but which are generally cracked and let in quite enough air to burn out a good deal of the carbon from parts at least of the sheets). A strip of varying width round the edges shows airing by its color. These boxes are heated up slowly, which may take from a few hours to a day according to size, and then maintained from 8 to 24 hours or more at full red heat and allowed to cool down very slowly, heating and cooling taking altogether from one to three days. This gradual heating and cooling, if carried at all to excess as to temperature or length of time, will undo the good of reheating by promoting the growth of grain, and if too much air gets in, by burning out the carbon, so that in either case the sheets may be more brittle than before. The more rapidly it is possible to heat the sheets up and the less the time they are kept hot once they have reached cherry-red, the smaller the grain and the tougher they will be.

All sheets that are paired or folded two or more times are liable to get foreign matter, such as scale, coal dust, or ash, etc., between them, which may stick to and become imbedded into the plates, and form streaks of various shapes, sizes, and color, or, if they afterwards come away, leave the corresponding roughness and indentations on the surfaces. These streaks if only small and thin may be removed by the pickling which usually follows, and the roughness obliterated by subsequent operations, such as cold rolling, tinning, or galvanizing. The foreign matter is always present to a greater or less degree, and it is rarely that slight streaks may not be observed on such sheets; but when they are rolled a little hotter than usual, so that the surfaces are softer, the dirt sticks and is rolled in more easily, the result being wasters. No streaks of this description are ever the fault of the steel maker.

The writer was some years ago afforded the opportunity of investigating this matter thoroughly at several works, and was able to reproduce at will all kinds of typical streaks and indentations, and thus to demonstrate clearly to the complete satisfaction of the principals how they were brought about and obtain their full admission that this was so. The chief treatment which sheets may have to undergo are for:

	Tinning.	Galvanizing.
1.	Rolled, , ,	Rolled.
2.	Black pickled and swilled.	Annealed (not always for common sheets).
3.	Annealed in boxes as described.	Black pickled and swilled.
4.	Cold rolled.	
5.	Annealed again, but more lightly.	Galvanized in molten zinc at a temperature of 412°—500° C.
6.	White pickled and swilled.	
7.	Tinned.	

Afterwards stamped, pressed, etc.

Strips being simply narrow thin plates, much the same applies to these as to the latter. For stamping, shearing, punching or similar purposes they should be very soft. They are used either in the state as rolled or as cold-rolled bright strip. This latter, though materially hardened and sometimes rendere brittle by the pickling and subsequent cold rolling it has undergone, cannot be annealed after cold rolling, because this would spoil the smooth bright surface. In either case, that they may be as soft as possible at the outset—if rapid reheating to cherry-redness for a minute or two and allowing to cool naturally in air, or an ordinary annealing as for sheets is not practicable—finish rolling at a good cherry-red and allow to cool slowly in large heaps.

Strips for welding into tubes, or for any purpose in which there is further reheating, should receive as little heating and be rolled at as low a temperature as practicable, since they have in all to stand a lot of fire, and rolling hardness in them does not matter, as it is at once removed by the next heating.

Hoops, being simply smaller strips, come under the same category. There is sometimes a tendency, as they are so thin and cool rapidly whilst rolling, to heat them to a very high initial temperature, and perhaps burn them, causing red-shortness. Again, a good deal of importance may attach to the degree of stiffness they possess and to their color, on the one hand (as in baling hoops), whilst on the other, if they are of 0.2 per cent to 0.4 per cent carbon they may be brittle if rolled at too low a temperature. A good deal may be done to avoid all the troubles named by rolling at not too high an initial temperature, so as to avoid red-shortness, but cooling slowly in heaps to avoid too great hardness.

Wire Rods and Wire.

Though the area of these is relatively small, wire rods are generally rolled so fast, especially in continuous mills, that

*Extract from a paper on "The Correct Treatment of Steel," read at the Glasgow meeting of the Iron and Steel Institute, September, 1901.

they finish at a good red heat, and being wound in compact coils, which are often stacked in large heaps, they cool slowly, and are not so hard as might have been expected. At the same time the rolling hardness is considerable, as can be seen from a comparison of the twisting test on wire as it leaves the rolls, and the same after rapidly reheating to cherry-redness and allowing to cool. The hardness is no doubt increased locally wherever the rod touches a cold object, such as a part of the reel, a floor-plate, or cold coil, or if put outside in wet weather, and may sometimes amount to brittleness.

High carbon steel is of course more affected by all hardening influences than low carbon steel. It is not often that wire rods are finished hot enough to render them, even with slow cooling, brittle or "rotten" from this cause, but occasionally in the thicker grades, such as guide rods, ⅜ inch in diameter and upwards, instances have been met with, though it is more than probable there has also been "soaking" of the billets before rolling when this occurs.

Wire rods for drawing are usually first pickled, swilled, lime-washed, and annealed, and then, after every two or more drawings (according to the reduction, the carbon contained, etc.), reannealed lightly. There is no doubt a tendency to draw through as large a number of holes as possible and minimize annealing. Cold drawing has, of course, a very marked hardening effect, and, if carried a little too far, may easily make the steel brittle.

Wire rods and wire for galvanizing, after pickling, are usually passed through a long red-hot furnace at such a rate that they are not scaled, but just dried and heated up to about the melting point of zinc before entering the bath. Zinc melts at 412° C. (which is just above blue heat), and to avoid loss of zinc it must not get too hot, so that the wire, with its pickling hardness perhaps not completely removed, is for a short time, both before, during, and after galvanizing, kept at or near blue heat whilst under tension and vibration. It is not surprising, therefore, that hardness or brittleness is more frequently met with, especially in guide rods and large sizes, in galvanized than in ungalvanized goods.

Pickling.

It is pretty well recognized, and there is a good deal of published evidence, that pickling causes hardness and brittleness, sometimes to a very marked extent, which is generally attributed to an alloying of hydrogen with iron, and this is no doubt substantially correct. The writer has several times heated pieces of pickled wire rod of various ages that were hard in an atmosphere of carbonic acid contained in a glass tube sealed at one end, and obtained particularly between barely visible red (say 500° C.) and low cherry-red heat, to which the heating was continued, an evolution of gas which (besides the carbonic acid gas used), on testing, proved to be hydrogen. As soon as this gas was liberated the sample became quite soft. The writer has never seen conclusively explained why or under just what conditions the hydrogen is absorbed, whether it is a question of strength of acid, temperature, or length of time, but it is quite certain that pickling does not always have the same effect.

It is also pretty well recognized that pickling may cause blisters on thin sheets. These pickling blisters are quite distinct from ordinary blowhole blisters, and are usually thickly distributed over the plate, and range from about the size of a pin-head to that of a pea. They never appear until after pickling, and often come up during the annealing which follows it. Such blistered sheets are also brittle. The writer has sheared such blistered sheets into shreds under water, and collected the liberated gas, which consisted essentially of hydrogen, as obtained from the pickled wire rod; whereas blowhole blisters, such as are occasionally met with in the sheets when first rolled, are generally larger (sometimes quite large), occur isolated or in small groups, and consist chiefly of carbonic oxide and nitrogen, no hydrogen.

Pickling blisters, if they only come up after annealing, have lost their hydrogen, it having been expelled by heat and replaced by air. Frequently a small hole is visible in the head of each blister where it has burst and the air entered. As with pickling hardness so with pickling blisters; the writer cannot exactly say what are the conditions under which they are produced. At some works they are recognized as being solely the product of pickling, whilst at others, with exemplary consistency, the steel maker is blamed for them.

Some years ago, at one of several works where the writer was assured that pickling was solely responsible for them, to prove it about a dozen plates were taken at random from a number of packs (all of which had been pickled in the ordinary course without any blisters appearing), and hung over the side of a pickling vat so that they dipped half-way in, and after a short time the lower halves of the plates were all covered with pickling blisters, the line of demarcation being quite sharp. In this case the extra pickling was the immediate cause. It seems probable that the grains, which in thin sheets are flattened into flakes or laminæ, become separated perhaps by the action of the acid, and, when sufficiently thin, the film of metal is distended by the hydrogen, either at once or by the heat whilst annealing.

From experiments conducted by the writer (though he cannot consider them final, it seems strongly probable that blistering is promoted by a higher temperature of the sheets when rolled, or by soaking them longer than usual, such treatment tending to burn out the carbon and permit separation of the fibre.

Galvanizing.

Much the same applies to other articles as has been described under the head of galvanizing wire rods. It is pretty generally recognized that it tends to produce brittleness, mainly, no doubt, from the causes mentioned, and possibly also from the brittle nature of the zinc-iron alloy which forms at the junction of the two metals when they are properly united. All that can be done is to keep the steel as soft as possible up to the stage of pickling as described for wire, and heat the goods as hot as possible after pickling (short of oxidizing the surface and preventing the adhesion of the zinc) so as to expel hydrogen and restore softness, and avoid all chilling, and cool as slowly as possible, after leaving the zinc bath.

Cold Drawing or Rolling.

In large sizes, as the work penetrates the mass still less, the compression and distortion of the surface sets up a state of strain and sometimes minute transverse cracks, predisposing to fracture.

As both the pickling which preceded it and the cold drawing have hardening effects, it is most desirable that the steel should be in a very soft condition prior to these operations. Therefore, where possible, it should be annealed by rapid reheating to cherry-redness, as previously described, or by the ordinary methods; or, failing this, finished sufficiently hot, or cooled sufficiently slowly, after rolling to (whilst avoiding large grain, and want of toughness on that score) also avoid rolling hardness. Rods predisposed to brittleness, either by finishing above critical temperature, and thus leaving the grain too coarse, or by finishing at or near blue heat, are, when subjected to the further hardening and straining effects of pickling and cold drawing, almost certain to become very brittle.

These few examples should suffice to illustrate some of the directions in which to look for causes for unusual behavior; but, of course, the number of possible causes which might bring about a result is very large, though a careful consideration of each particular case should facilitate a correct solution.

Enormous Steel Consumption for Cars.

Statistics in regard to the work done by the Pressed Steel Car Co. of Pittsburg are interesting in view of the fact that the company is the largest single user of steel in the world. The material used is medium-soft Carnegie steel and the company uses on an average over 1,600 tons a day, or over 500,000 tons a year. In the four years during which the manufacture of pressed steel cars has been carried on, up to Sept. 1, 1901, the company has used about 1,657,080,000 pounds of iron and steel in the construction of the 46,030 cars which it has built. If these cars were placed end to end, allowing 35 feet as the average length of the car and two feet for the couplings, they would form a continuous train 1,703,110 feet in length, or over 322 miles. These cars would carry about 4,603,000,000 pounds of freight, and the weight of the freight and the cars combined would be 6,240,080,000 pounds or 3,130,040 tons.

SUGGESTED AT THE SHOP.

F. O. REMAN.

Appreciation is the best lubricant we have in the shop, a little more of it and the friction that winds up in a strike would seldom exist. General appreciation means mutual respect and when we have that feeling in the shop, work will move along with the smoot hsatisfaction with which a man starts the second, or maybe the third, cut on a long and heavy shaft. Some of the things written in this column have been getting greater circulation; that means they have been appreciated, and I am correspondingly cheerful.

* * * * *

Along the beginning of last month, Aug. 8, I made a suggestion in regard to the graduation of a steel tape for the measurement of rolls of large diameter; that the usual inch spaces should be lengthened out 3.1416 times and then, by measuring around the circumference, you could read off the diameter in actual inches without any calculation. The *American Machinist* takes up this suggestion in the issue of Aug. 22 and in the current issue of the *Machinist* other ideas come along to strengthen my original belief in the usefulness of the scheme.

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C. S. Beach, of Bennington, Vt., writes as follows to the above journal "I note on page 956 that a steel tape having standard graduations on one side and circumference measures on the other would be a handy thing. I wished for just that thing myself a few years ago, but, having a pocket tape with metric divisions on one side, I discovered that 95.8 centimeters is the circumference of a 12-inch circle within .02 inch, so, roughly speaking, 8 centimeters equal the circumference of 1 inch, and this makes easy calculation for diameters in sixteenths of an inch. While this new use should not delay the production of the tapes you mention, it may be handy to know for those having metric tapes."

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Another correspondent, Mr. J. Y. Wheatley, has this to say on the subject: "Referring to an editorial note on page 956, in which you speak of the usefulness to the trade of a steel tape graduated with the principal divisions 3.1416 inches apart in such work as measuring wheels, rolls of large diameter and things of that character, I would say that the Keuffel & Esser Co., of 127 Fulton Street, New York City, is making a special tape to fill the need mentioned in your note. The tape is of steel, 12 feet long, and contained in a German silver case with stop and spring. One side of the tape is graduated in inches and sixteenths. The other side is divided into spaces 3.1416 inches in length and numbered, 1, 2, 3, 4, 5, etc., the first space being further subdivided into 64 equal parts. Passing the tape about the periphery of the wheel or roll, the circumference is at once read off on one side of the tape and the diameter on the other. Other uses of the tape are evident, and from my own experience in its use, the statement of its value to the trade, made in the note above referred too, is none too strong."

* * * * *

There is some advantage in having the two scales on the one tape and the two are sufficientiv distinct in this case to avoid confusing the one for the other. I cannot say, however, that I have very much respect for the fad for combination tools and am inclined to believe that there is little real economy in the attempt to crowd several items into the one instrument. I once bought a scale which was divided into eight different ways on the two edges and have had little profit out of the thing to excuse me for the outlay. It is true that it is not much of a task to turn the scale and get the divisions you want, but it is not essential to the work and that is the main item. Eight different scales would have cost a great deal more, proportionately, but when any one of them was in use there would not have been any possible doubt about the scale and there is seldom any need for more than one at a time.

The plant of the Canton-Cleveland Axle Works, Canton, O., is practically completed and will be placed in operation shortly.

ROOFING PLATE PROBLEMS.

A careful study of the present position of terne plate for roofing reveals the fact that a prejudice exists in certain quarters against its employment, and this prejudice is clearly traced to any of three causes; the use of poor material, poor workmanship, and insufficient attention after the roof has been laid. The troubles incident to these causes, where they happened to exist, has produced a prejudice in the minds of those who did not understand the cause or causes of the difficulty.

That a tin roof is the best of all roofs when the proper conditions are observed is proved by the fact that many architects all over the country who have made a careful study of the subject of roofs specify nothing but terne plate for roofing when the owner is willing to pay a reasonable price. There are many instances of tin roofs which have lasted for fifty years and are still in good condition. Such roofs are to be found in Boston today, although the sea air is supposed to be particularly hard on terne roofing. In Springfield, Mass., a building was recently taken down which had had a terne roof on it for forty years, the roof being in perfect condition and apparently good for many years more. With such facts in view it is evident that tin roofs can be preserved almost indefinitely, and it is evident that where they have failed there has been some particular cause. Care must be exercised in the selection, application and maintenance of any building material, but this is especially true of tin roofing. However, the many advantages of this form of roof covering over others are amply sufficient to outweigh other considerations. The elements of lightness, immunity against fire, cheapness and small liability to injury from being walked upon are of the utmost importance.

We have referred in the past to the injury which was done the terne roofing trade by the cheap brands put on the market a few years ago. It is now much easier to secure a good brand, and this point should be borne in mind in cases where roofs have failed to give entire satisfaction. In the matter of laying there has been considerable trouble owing to ignorance of the proper conditions to be observed. A great many roofs have failed through rusting, not from the upper, but from the lower side. It is therefore imperative that the tin should be painted on the under side before laying. This can be done after the sheets have been soldered together into strips, and as much care should be exercised in selecting the paint for the under side as for the upper side—and even more, because the upper side is open for inspection, and a mistake can be more readily discovered.

There is a difference of opinion as to the advisability of laying paper under the roof. Most architects favor the laying of paper under a tin roof, merely on general principles. But it has been discovered in some cases that the tar paper used contained chemicals which will eat through both paint and tin. The use of parchment paper, which some architects recommend, would probably not be open to this objection. However, we know of a case in Plainfield, N. J., where a house was recently taken down which was erected in 1870, and the tin roof, after having been in service for thirty years, showed the under side as bright as the day it was put on, showing that in some cases at least the painting on the under side is not required. In the sheathing it is desirable to use narrow boards, well seasoned, so that the sheets will be firmly held, and less trouble will be experienced with contraction and expansion, because each portion of the roof will act as a unit. Some builders even advocate the use of tongued and grooved flooring, which, besides preserving the roof, would tend to make the house easier to heat.—[Tin and Terne.

The J. G. Brill Co., builders of electric cars, will establish a plant in England. John A. Brill, vice president of the Brill Co., is now in England to select a location for the new works. British capital will be enlisted to a considerable extent, but the plant will be operated on American lines.

The production of pig iron in Germany for July was 649,539 metric tons. For the seven months ending July 31 the total was 4,603,318 tons, against 4,802,070 tons in the first seven months of 1900.

IRON AND STEEL PROGRESS IN THE NINETEENTH CENTURY.

General Manager James M. Swank, of the American Iron and Steel Association, has prepared for the United States Geological Survey a valuable monograph on "Iron and Steel at the Close of the Nineteenth Century." In its 40 pages are compressed the salient facts in connection with the development of the iron industry in the United States in the 17th, 18th and 19th centuries, together with a review of the status of the industry at the close of 1900, and important statistics of production in this and other countries in 1899 and 1900. Mr. Swank has been identified with the iron trade in all the years of marvelous growth that have followed the sixties, and no one is so fitted to present this impressive picture of progress. The pamphlet is an admirable example of the eloquence of facts and statistics brought together by one who knows thoroughly their significance. We have already reproduced from the *Bulletin* Mr. Swank's presentation of the iron and steel statistics of the United States for 1900. The following additional tables which we take from the pamphlet just published are of special interest:

SUMMARY OF IRON AND STEEL STATISTICS FOR GREAT BRITAIN FOR 1899 AND 1900.

	1899	1900
Production of coal in Great Britain.....long tons..	220,094,781	225,181,300
Export of coal from Great Britain.....do.....	41,180,313	44,089,197
Production of iron ore in Great Britain.....do.....	14,461,330	14,028,208
Imports of iron ore by Great Britain.....do.....	7,054,578	6,297,963
Production of—		
Pig iron in Great Britain.....do.....	9,421,435	*a*8,908,570
Bessemer steel ingots in Great Britain.....do.....	1,825,074	1,745,004
Bessemer steel rails in Great Britain.....do.....	838,148	759,844
Open-hearth steel ingots in Great Britain..do.....	3,030,251	3,150,050
All kinds of steel in Great Britain.....do.....	5,000,000	5,050,000

a British Iron Trade Association.

IRON AND STEEL STATISTICS FOR EUROPEAN CONTINENTAL COUNTRIES FOR 1899 AND 1900.

	1899	1900
Production of—	Metric tons	Metric tons
Coal and lignite in France	32,863,702	33,270,385
Iron ore in France	4,985,701	.....
Pig iron in France	2,578,401	2,699,494
Bessemer steel ingots in France	879,181	954,261
Open-hearth steel ingots in France	669,845	669,787
Miscellaneous steel in France	31,806	36,070
All kinds of steel in France	1,530,832	1,660,118
Coal and brown coal in Germany	135,844,419	149,551,058
Iron ore in Germany and Luxemburg	17,989,635	18,964,367
Pig iron in Germany and Luxemburg	8,143,133	8,520,390
Finished steel in Germany	6,328,666	6,365,259
Coal in Belgium	22,072,068	23,352,000
Iron ore in Belgium	201,445	.....
Pig iron in Belgium	924,576	1,018,307
Steel ingots in Belgium	731,249	654,827
Coal in Spain	2,565,437	2,773,000
Iron ore in Spain	9,397,733	8,480,246
Pig iron in Spain	295,840	294,118
Bessemer and open-hearth steel ingots in Spain	122,954	.....
Coal in Sweeden	239,344	252,320
Iron ore in Sweden	2,435,200	2,609,500
Pig iron in Sweden	497,727	526,868
All kinds of steel in Sweden	273,454	300,536
Coal and lignite in in Italy	388,531	.....
Iron ore in Italy	236,549	.....
Pig iron in Italy	19,218	.....
Steel in Italy	108,501	.....
Coal and lignite in Austria-Hungary	38,738,372	.....
Iron ore in Austria-Hungary	3,293,003	.....
Pig iron in Austria-Hungary (1896)	1,475,000	.....
Steel in Austria-Hungary	880,696	.....
Coal in Russia	13,558,000	15,890,000
Pig iron in Russia	2,675,000	2,895,666
Steel ingots in Russia	.....	1,830,260
Finished steel in Russia	1,321,351	1,462,809
Exports of coal from Germany	13,943,174	15,275,805

IRON AND STEEL STATISTICS FOR VARIOUS FOREIGN COUNTRIES FOR 1899 AND 1900.

	1899	1900
Production of—		
Coal in Canada.....short tons..	4,925,051	5,597,832
Coke in Canada.....do.....	100,820	157,134
Iron ore in Canada.....do.....	74,617	122,000
Pig iron in Canada.....long tons..	94,077	86,090
Steel in Canada.....do.....	22,000	23,577
Coal in India.....do.....	4,937,160	6,093,438
Iron ore in India.....do.....	60,725	.....
Pig iron in India.....do.....	19,631	.....
Coal in New South Wales.....do.....	4,597,028	5,507,497
Coal in other Australasia.....do.....	1,830,100	.....
Coal in Japan in 1898.....metric tons..	6,761,301	.....
Pig iron in Japan in 1898.....do.....	23,652	.....
Iron ore in Algeria.....do.....	550,941	.....

RAILROAD STATISTICS FOR THE UNITED STATES AND FOR ALL OTHER COUNTRIES FOR 1899.

	Miles.
New railroad built in the United States	4,528
Completed railroad in the United States on Dec. 31, 1899	189,295
Completed railroad in Europe at the end of 1899	172,641
Completed railroad in Asia	35,938
Completed railroad in Africa	12,501
Completed railroad in Australasia	14,675
Completed railroad in North America	216,390
Completed railroad in South America	27,874
The world's railroad mileage at the end of 1899	479,899

As a chronicle of the important events in our iron and steel history for the past 25 years and an epitome of the statistics of production in that time we take the following from the chronological record that is a most valuable feature of the work:

1875.—Pig iron made with bituminous fuel passed that made with anthracite.

1875.—The first 60-foot rails rolled in this country were rolled by the Edgar Thomson Steel Co., at its works near Pittsburg, in the fall of 1875, and were of steel.

1875.—The Whitwell fire-brick hot-blast stove, the invention of Thomas Whitwell, of England, was first used in this country at Rising Fawn furnace, in Dade county, Ga., on June 18, 1875. Its next application was at Cedar Point furnace, at Port Henry, in Essex county, N. Y., on Aug. 12, 1875. The stoves at Cedar Point furnace were, however, built before those at Rising Fawn furnace.

1875.—The first wire nails that were made of steel wire in this country were made at Covington, Ky., in 1875, by Father Goebel, pastor in charge of St. Augustine's Catholic Church in that city, who imported a wire-nail machine from Germany. Father Goebel in the same year formed the Kentucky Wire Nail Works and ordered two more machines, he being president of the company. Thus originated the present extensive wire-nail industry of the United States.

1875.—At the Centennial Exhibition at Philadelphia in 1876, the Edgar Thomson Steel Co. exhibited a steel rail which at that time was the longest steel rail that had ever been rolled. It was 120 feet long and weighed 62 pounds to the yard.

1877.—The first set of Siemens-Cowper-Cochrane fire-brick hot-blast stoves erected in this country was erected at one of the Crown Point furnaces, in Essex county, N. Y., in 1877, but the first set of these stoves in any part of America was erected at Londonderry, in Nova Scotia, by the Steel Company of Canada, Limited, in 1876. The Siemens-Cowper-Cochrane stove is an English invention.

1878.—The world's production of pig iron in 1878 was estimated in 1879 by the compiler of this chronological record to have amounted to 14,262,174 tons, and the world's production of steel in the same year was estimated by the same authority to have amounted to 2,941,775 tons.

1880.—The first elevated railroad constructed in this country in connection with a regular freight and passenger railroad was undertaken by the Pennsylvania Railroad Co. in 1880 and finished in 1881. It constitutes an extension of the main line of the Pennsylvania Railroad to the heart of the city of Philadelphia and is about a mile long.

1883.—The celebrated steel suspension bridge over the East river, connecting New York with Brooklyn, was projected in 1865, but its construction was not actually undertaken until 1869. Its engineer was John A. Roebling, who died in that year, being succeeded by his son, Washington A. Roebling. The bridge was completed and formally opened on May 24, 1883. The total length of the bridge and approaches is 5,989 feet. The length of the main span is 1,595 feet. The wire cables for the Brooklyn bridge were made of American steel.

1884.—In 1884 we commenced to import iron ore from Cuba.

1884.—The first basic steel made in the United States was produced experimentally at Steelton, Pa., by the Pennsylvania Steel Co., on May 24, 1884, in a Bessemer converter.

1884.—In 1884 there were still in existence in this country several slitting mills, which were used spasmodically in the conversion of iron into nail rods. There was a slitting mill at the Cambridge rolling mills near Boston; another at the Norway Steel and Iron Works at South Boston; another at the Eagle Iron Works at Roland, Center county, Pa., and another at the Oxford Iron and Steel Works at Frankford, Pa.

1887.—The first contract for American-made armor was made by the Navy Department with the Bethlehem Iron Co. on June 1, 1887, and was for two battle ships and four monitors, and called for 6,700 tons of plain steel armor, oil-tempered and annealed, at an average price of $536 per ton. But the first armor actually made in this country was made by this company in 1890.

1888.—The beginning of the manufacture of basic steel in this country as a commercial product dates from 1888, on the 28th of March of which year the first basic open-hearth steel was produced at the Homestead Steel Works of Carnegie, Phipps & Co., Limited, at Homestead.

1890.—In this year the United States for the first time made more pig iron than Great Britain. This leadership was steadily maintained until 1894, when it was lost, but in 1895 it was regained. In 1896 it was again lost, but it was again regained in 1897, and has since been maintained.

1890.—The world's production of pig iron in this year is given in *Iron in All Ages* as 26,968,468 tons, and the world's production of steel in this year as 12,151,255 tons. The percentage of pig iron produced by the United States was 34.1, and its percentage of steel was 35.2.

1899.—Mr. Poor reports that in 1899 there were 250,362 miles of railroad track in the United States, including second track and sidings, of which 229,645 miles were laid with steel rails and 20,717 miles were laid with iron rails.

1900.—The production of crucible steel in 1874 was 32,436 tons; in 1880 it was 64,664 tons; in 1890 it was 71,175 tons; in 1899 it was 101,213 tons; and in 1900 it was 100,562 tons.

1900.—The production of open-hearth steel in 1869 was 893 tons; in 1870 it was 1,339 tons; in 1880 it was 100,851 tons; in 1890 it was 513,232 tons; and in 1900 it was 3,398,135 tons.

1900.—The production of Bessemer steel in the United States in 1867 was 2,679 tons; in 1870 it was 37,500 tons; in 1880 it was 1,074,262 tons; in 1890 it was 3,688,871 tons; and in 1899 it was 7,586,354 tons. The production in 1900 was 6,684,770 tons.

1900.—The production of all kinds of steel in the United States in 1867 was 19,643 tons, Bessemer steel included; in 1870 it was 68,750 tons; in 1880 it was 1,247,335 tons; in 1890 it was 4,277,071 tons; in 1899 it was 10,639,857 tons; and in 1900 it was 10,188,329 tons.

1900.—The production of Bessemer steel rails in 1867 was 2,277 tons; in 1870 it was 30,357 tons; in 1880 it was 852,196 tons; in 1890 it was 1,867,837 tons; and in 1900 it was 2,383,654 tons.

1900.—In this year the United States for the first time made more open-hearth steel than Great Britain.

1900.—In 1871 the United States imported 82,969 tons of tin plates; in 1880 it imported 158,049 tons; in 1890 it imported 329,435 tons; and in 1900 it imported 60,386 tons.

1900.—In the last six months of 1891 our production of tin plates and terne plates was 999 tons; in 1895 it was 113,666 tons; in 1899 it was 360,875 tons; and in 1900 it was 302,665 tons.

1900.—In 1872 the production of spiegeleisen and ferromanganese was 4,072 tons; in 1880 it was 17,503 tons; in 1890 it was 133,180 tons; and in 1900 it was 255,977 tons. These figures are included in the statistics of pig iron already given.

1900.—The world's production of pig iron in 1900 we estimate to have amounted to about 40,400,000 tons.

The Clergue Steel Works.

About 3,000 men are now employed on the construction work in progress at the Bessemer steel plant of the Clergue syndicate at Sault Ste. Marie, Ont. A network of railroad tracks covers the yards, and the installation of equipment is proceeding rapidly. Seven large steam dredges are working day and night on the Canadian channel above the government lock, preliminary to the erection of an ore dock, 1,800 feet long, for the handling of Michipicoten and other iron ores. The rail mill will be ready for operation in two or three months, and its entire output for some years has already been sold to the Canadian government. At this mill there will be as extensive an application of electricity as possible, and the second Canadian canal is expected to furnish this as well as power for the other works. Three eight-foot cupolas are installed for melting pig for conversion, the necessary iron being expected for a time to come from the works of the Canada Iron Furnace Co., at Midland, Ont. Later, when the blast furnace plant now under way is completed, the direct process will be adopted and metal taken from them. Two acid-lined Bessemer converters of five tons capacity each are in place and the pit furnace, heating furnace and finishing buildings with their equipment are being completed as rapidly as possible. The main building is 1,500 feet long and of varying widths.

PERSONAL.

John M. Millman, of South Milwaukee, Wis., has resigned as secretary and treasurer of the Bucyrus Steam Shovel Co. and will remove to Chicago. He is succeeded by E. K. Swigert, of Milwaukee.

Stuart B. Marshall, for a number of years chemist for the Dunbar Furnace Co., Dunbar, Pa., has become Pittsburg manager for L. & R. Wister & Co. of Philadelphia, dealers in iron, steel, coal and coke. His office is at 331 Fourth Ave.

Charles H. Morgan, president of the Morgan Construction Co., Worcester, Mass., who has been in attendance at the International Engineering Congress held at Glasgow, is expected to arrive in Boston by the Saxonia Sept. 19.

William M. Douglass, for many years general manager of the Allentown, Pa., plant of the American Steel & Wire Co., has been appointed assistant manager of the Pittsburg and New York districts of the company.

Henry C. Frick returned last week from a three months' trip abroad. He visited many points on the Continent of Europe and in the British Isles.

G. B. McCormack, who recently resigned as general manager of the Tennessee Coal, Iron & Railroad Co., has been appointed vice-president and general manager of the Woodward Iron Co. of Woodward, Ala.

J. W. Leroux, who has been general manager of the Structural Iron & Steel Co. of Baltimore, Md., has been elected president to succeed W. T. Stillwell.

Manager George D. Evans, of the Lisbon, O., plant of the American Tin Plate Co., has resigned, to accept the management of the Carnahan Tin Plate Co.'s plant under construction at Canton, O.

Harry H. Cockley, of Cleveland, has tendered his resignation as secretary of the Shelby Steel Tube Co. and it has been accepted, effective Oct. 1.

Samuel Siddall, formerly district sales agent of the American Steel Hoop Co. at Cincinnati and later connected with the Cincinnati office of the constituent companies of the United States Steel Corporation, has resigned. He has been appointed manager of sales of the Victor Rubber Tire Co., Springfield, O., and has already assumed his new duties.

Geo. T. Oliver, Henry W. Oliver and W. r. Snyder, of Pittsburg, have returned from Europe.

Otto Hoffman, for some years connected with the Whitman & Barnes Mfg. Co. of West Pullman, Ill., has resigned to accept the position of superintendent of the plant of the James H. Baker Mfg. Co., at Pittsburg.

Thos. J. Farrell, assistant export sales agent of the American Steel & Wire Co., at New York, has been appointed manager of the London office of that company, succeeding A. Holland.

W. J. Olcott, manager of the Mesabi range properties of the United States Steel Corporation, has been elected president of the Duluth, Mesabi & Northern Railway; Chas. E. Scheide, of New York, assistant treasurer, and Chas. D. Fraser, assistant secretary. A. B. Wolvin, manager of the steel corporation's fleet, has been made a director of the road.

Cohen, Nagusky & Co., dealers in iron and steel scrap have located on Willson Ave. and Pennsylvania R. R., Cleveland. The yard is being equipped with three shears, railroad scales, cranes, sheds and everything necessary to make it one of the best equipped scrap iron yards in the country. Their largest shear will have a 32-inch blade and will cut the heaviest section of iron or steel rails, and up to five-inch round iron cold; weight about 5,200 pounds. The Lloyd Booth Co. of Youngstown are building the shears. Messrs. Max. Cohen and Jos. Nagusky have been connected with the scrap iron business for many years.

Referring to the active demand for steel rails for next year's delivery, as noted in these columns, the *Marine Review* says: "This is a matter of some encouragement in lake vessel circles, as new vessels capable of carrying 2,500,000 tons in a season will come from the stocks next spring, and the old question 'What will be done with this surplus?' has repeatedly been asked of late."

The Steel Strike Settled by Agreement.

PITTSBURG, Sept. 17.—At a conference held last Saturday at New York between the advisory board of the Amalgamated Association and representatives of the American Tin Plate Co., American Sheet Steel Co., National Steel Co. and the American Steel Hoop Co., the steel strike, begun on July 1, was settled. It was immediately called off by President Shaffer and the men affected were ordered to return to work this week. The terms of the settlement, while not given out by either the manufacturers or the officials of the Amalgamated Association are practically the same as were indicated to the National Civic Federation by representatives of the United States Steel Corporation a short time before, but additional concessions have been granted by the workers which especially affect the tin plate mills.

By the agreement all the mills of the American Tin Plate Co. at which operations were resumed while the strike was on are to continue in operation non-union. All mills of the American Steel Hoop Co. signed for last year were again signed for, but none of the lodges organized at various plants since the strike was recognized. The American Sheet Steel Co. signed for all mills signed for last year except Saltsburg and Old Meadow, and all mills at which operations were resumed since the strike are to continue non-union. Neither the Wellsville nor Wood plants was signed for. The National Steel Co. agreed to sign the scale for the Mingo Junction plant at Mingo Junction, O., but refuses to sign a local scale for its New Castle, Pa., plant, as the company claims that it has secured a large number of individual contracts from the men employed at this plant, and that the plant can be operated non-union hereafter without any difficulty whatever. The National Tube Co. and the Illinois Steel Co. in no way figured in the agreement outside of the fact that the Amalgamated Association agreed to call off the strike at all its mills affected. The National Tube Co. has heretofore signed local scales at its Elba and Republic plants located in Pittsburg and the men can return to work under the scale signed for these two plants this year. Otherwise neither the Amalgamated Association nor the American Federation of Labor is recognized and the men who went out on sympathetic strikes return to the mills under the same conditions as prevailed before the strike was declared.

Only local scales are signed by the Illinois Steel Co. for its Bay View, South Chicago and Joliet plants and the men have returned to work at Bay View and Joliet under the existing scale. The men at South Chicago refused to obey the general strike order and continue at work under the scale signed some time ago. As the charter of the South Chicago lodge has been revoked the men at this plant can no longer be considered as members of the Amalgamated Association, while a majority of the men employed at the Bay View plant also returned to work without the sanction of the Amalgamated Association and they, too, will probably be read out of the association. The men at Joliet, Ill., returned to work last week with the sanction of President Shaffer and this would still leave them inside of the association. However, it is reported from the West that the steel workers employed at the plants of the Illinois Steel Co. will shortly break away from the Amalgamated Association altogether and will form an organization of their own representing the Western iron and steel trades.

No Strike Without Ninety Days Notice.

The non-interruptive clause adopted at the last convention of the Amalgamated Association was signed at the settlement in some modified form, and it is understood that before any future strikes can be declared a 90-day notice must be served on the manufacturers while the latter must serve the same notice in case a change in the scale is desired. It is also understood that concessions were granted the American Tin Plate Co. governing the operation of their union mills which are very desirable, and do away with abuses that should have been corrected long ago. It is further stated that the non-union tin plate mills will be operated on what is known as the Monessen system, which will greatly increase the output of the mills. Instead of roughing and finishing on the same mill the roughing will be done on one mill and the finishing on another.

In the settlement the Amalgamated Association made no provision whatever for the men who joined lodges since the strike was declared, throwing idle a number of mills, and these men will be compelled to return to work as individuals if they go back to the mills in which they were formerly employed. The butt and lap welders of the National Tube Co. who went out in sympathy with the Amalgamated Association employes received no consideration whatever in the settlement, nor will the National Tube Co. recognize any of the organizations they have formed since the strike was declared.

The settlement is not at all satisfactory to the men and yesterday and today committees from various mills throughout the country, left out in the cold called at the Amalgamated Association headquarters protesting against the acceptance of such peace terms. A continuation of the strike would without doubt have resulted in the loss of everything and as the terms offered were open to acceptance until last Saturday night there was nothing left for the Amalgamated Association to do but to accept them if it was to save its organization. Today that body stands discredited not only among the manufacturers but with its own members. It is in ill repute with the manufacturers owing to its contract breaking propensities and with its members owing to the refusal of its officials to stand by them when a settlement is affected. In addition the association after declaring off a strike has as yet failed to show sufficient strength to compel the men to return to work under the terms agreed upon.

Amalgamated Losses Summarized.

Fully one-fourth of the mills of the American Tin Plate Co. have been made non-union as a result of the strike and the Amalgamated Association loses 1,300 men in the tin plate trade. One-fourth of the strength of the association in the mills of the American Sheet Steel Co. is also lost, costing the association about 500 members. About 200 men are lost in the National Steel Co., and about 500 have been lost to the association in the mills of the Illinois Steel Co. This is a net loss of about 2,500 men and does not include the men organized since the strike was declared. At the beginning of the strike the association had about 13,800 men and the strike losses reduces the total membership to less than 11,500. As about 9,000 men employed in the mills of the United States Steel Corporation were affected by the strike the Amalgamated men to be employed hereafter by the corporation will amount to about 6,500. Figures are not obtainable showing the financial strength of the association at the present time, but it is reliably reported that less than $25,000 remains in the treasury.

All the men employed in the plants of the Illinois Steel Co. have returned to work while the mills in the Youngstown, O., district of the American Steel Hoop Co. started in full on Monday. The Pittsburg plants of the latter are also on in full. At the National plant of the National Tube Co. at McKeesport, Pa., 9 of the 12 lap weld furnaces are in operation, while 3 of the 6 butt weld furnaces are also on. On Wednesday the Continental, Elba, Pennsylvania and Republic plants of the National Tube Co. will be placed in operation. No attempt has been made to place the Riverside plant at Wheeling, W. Va., in operation as the men at this plant are not at all satisfied with the terms of settlement, which provides that they return to work on the same basis as existed when they went out.

Operations were to have been resumed today at the New Castle, Pa., plant of the National Steel Co. and the Mingo Junction plant at Mingo Junction, O., will resume before the end of the week. The men at the Bellaire, O., plant refuse to return to work as non-union men.

The plants of the American Tin Plate Co. have resumed only in part. At Canal Dover, O., five mills are on in full and at a meeting of the strikers held last night it was decided that all apply for their former positions as individuals. The Canton plant will resume next week while the Dennison and Struthers, O., plants are operating in part. The Niles, O., plant is operating in full. At McKeesport, Pa., 8 mills of the Demmler plant are in operation while 10 of the 23 mills of the Laughlin plant at Wheeling, W. Va., are in operation. The American Sheet Steel Co. this week placed in operation its Aetna-Standard, Cambridge, New Philadelphia, Muncie, Ind.,

and Piqua, O., plants. The Dresden, O., plant is to resume operations tonight. At the present time fully 85 per cent of the mills of the American Sheet Steel Co. are in operation.

Tonnage Losses by the Strike.

Production of finished material at the various plants of the companies affected by the strike was curtailed as follows: American Sheet Steel Co., strike declared July 1, 25,000 tons. American Steel Hoop Co., strike declared, July 1, 75,000 tons. American Tin Plate Co., strike declared July 15, 1,250,000 boxes. National Tube Co., average shut down five weeks, 40,000 tons. Illinois Steel Co., average shut down four weeks, 50,000 tons.

Union and Non-Union Mills as They Now Stand.

The gains and losses as a result of the strike are given in the following recapitulation:

Mills formerly non-union made union:

None.

Mills signed for in 1900 and now made non-union:

American Tin Plate Co., Star, Pittsburg; Monongahela, Pittsburg; Beaver, Lisbon, O.; Cambridge, Cambridge, O.; Demmler, McKeesport, Pa.; Irondale, Irondale, O.; Crescent, Cleveland, O. (Chester mill, not run heretofore, established as non-union.)

American Sheet Steel Co.—Hyde Park, Hyde Park, Pa.; Saltsburg, Saltsburg, Pa.; Old Meadow, Scottdale, Pa.; Canal Dover, Canal Dover, O. (Chartiers at Carnegie, Pa., made non-union by removal to Vandergrift.)

American Steel Hoop Co.—None.

National Steel Co.—New Castle, New Castle, Pa.

Mills not signed for in 1900, but meanwhile organized or partly organized and shut down, but which are now non-union:

American Sheet Steel Co.—Wood plant, McKeesport, Pa.; Wellsville plant, Wellsville, O.

American Steel Hoop Co.—Painter, Clark and Lindsay & McCutcheon, Pittsburg; Monessen plant, Monessen, Pa.; Aetna-Standard, Bridgeport, O.

National Steel Co.—Bellaire plant, Bellaire, O.

National Tube Co.—Boston Iron & Steel Works, National Rolling Mills, Monongahela Steel Works, McKeesport, Pa.; Riverside Iron Works, Wheeling, W. Va.

Mills union in 1900 which remain union:

American Tin Plate Co.—American works, Elwood, Ind.; Anderson works, Anderson, Ind.; Atlanta works, Atlanta, Ind.; Canonsburg works, Canonsburg, Pa.; Champion works, Muskegon, Mich.; Cumberland works, Cumberland, Md.; Ellwood works, Ellwood City, Pa.; Falcon works, Niles, O.; Great Western works, Joliet, Ill.; Humbert works, Connellsville, Pa.; LaBelle works, Wheeling, W. Va.; Laughlin works, Martin's Ferry, O.; Morewood works, Gas City, Ind.; New Castle works New Castle, Pa.; Pittsburg works, New Kensington, Pa.; Pennsylvania works, New Kensington, Pa.; Reeves works, Canal Dover, O.; Shenango works, New Castle, Pa.

American Sheet Steel Co.—Canton works, Canton, O.; Dennison works, Dennison, O.; Dresden works, Dresden, O.; Falcon works, Niles, O.; Laufman works, Paulton, Pa.; Midland works, Muncie, Ind.; New Philadelphia works, New Philadelphia, O.; Piqua works, Piqua, O.; Struthers works, Struthers, O.; Aetna-Standard works, Bridgeport, O.; Cambridge works, Cambridge, O.

American Steel Hoop Co.—Upper and Lower Union works, Youngstown, O.; Warren works, Warren, O.; Girard works, Girard, O.; Pomeroy works, Pomeroy, O.; Kimberly works, Sharon, O.; Kimberly works, Greenville, Pa.

National Steel Co.—Aetna-Standard works, Mingo Junction, Ohio.

National Tube Co.—Elba Iron Works, Pittsburg; Republic Iron Works, Pittsburg.

Mills non-union in 1900 which remained in operation:

American Tin Plate Co.—National works, Monessen, Pa.

American Sheet Steel Co.—Apollo works, Vandergrift, Pa.; Kirkpatrick works, Leechburg, Pa.; Scottdale works, Scottdale, Pa.

American Steel Hoop Co.—Portage works, Duncansville, Pa.

Illinois Steel Co.—South Chicago works operating under Amalgamated scale but charter has been revoked from lodges whose members are employed in the mill. Joliet, Ill., plant operating under Amalgamated scale, men returned to work last week. Bay View, Wis., plant operating under scale, but owing to the action of a majority of the members who decided to return to work before the strike was declared off the charter of the lodge will probably be revoked.

All the mills of the United States Steel Corporation not otherwise mentioned.

Youngstown Iron and Steel Roofing Co.

The new sheet mill of the Youngstown Iron & Steel Roofing Co., located just east of Haselton, O., has been completed and put in operation. The plant contains four hot mills and two cold mills, with a sheet bar mill, all driven by an 1,800-h. p. Corliss engine, in a building 360x130 feet, which also contains the two bar shears, the puddling department and annealing department. The puddling department consists of four puddling furnaces and squeezer. The annealing department contains four double annealing furnaces. All the subsidiary machinery, including the bar and squaring shears, pumps and cranes, are operated by electricity. The galvanizing department is housed in a separate building, 80x200 feet, and contains the latest galvanizing equipment.

The plant is located between the Mahoning Valley railway and the Pittsburg & Lake Erie. The officers of the company are L. E. Cochran, president; G. M. McKelvey, vice president; Mason Evans, secretary and treasurer, and John O. Pew, general manager.

Two mills were put in operation first, on sheets 30x120 inches, 24 gauge, for the Mare Island Navy Yard in California. The plant will supply sheets also for the company's roofing and siding plant and for the plant formerly owned by the Youngstown Range & Stove Co., recently absorbed.

The company has 14 acres of land, giving ample room for extensions. Foundations are already in for two additional hot mills. Sheet bars are received on their own tracks in 25 to 30 foot lengths and sheared, after which they are taken to the heating furnaces, reheated and rolled into sheets. The bar mill is not yet ready to start, but it is the intention of the company when it is running to break down its own billets into bars, believing by doing this it can get bars better adapted to its requirements. The management is in the hands of John O. Pew, who has brought the roofing trade of the company to its present prosperous status.

Hon. J. N. Ruffin, U. S. Consul at Asuncion, Paraguay, who is spending his leave of absence in the United States, has brought with him some important orders from the Paraguayan Government. Among others a large order has been placed with the American Steel & Wire Co. for steel wire, and with the Western Electric Co., for telegraphic appliances (the latter amounting to $7,000) for a new telegraphic line from Asuncion to important forts or the Bolivian frontier. The order has been financed by the Export Shipping Co., of New York, acting as the disbursing agent of the Paraguayan government.

The National Rolling Mill Co., of Hartford City, Ind., started its muck mill this week, and expects to start its finishing mill by Oct. 1. The company already has a good tonnage on its books and with an up-to-date plant, good shipping facilities and an abundance of natural gas expects to attain both economy and quality in production. At the start 125 men will be employed. E. B. Mitchell is president of the company; J. H. Jones, secretary and treasurer; S. N. Bradshaw, general manager, and H. R. Philips, superintendent.

A Berlin cablegram of Sept. 15 announces a reduction by the rolled wire syndicate of 10 marks per ton in the price of wire and a reduction by the wire nail syndicate of 5 marks per metric hundredweight. The reports from German industrial centers continue gloomy. A number of first-class firms at Remscheid, the great hardware centers, are in difficulties. Some works there have reduced wages 10 per cent and many workmen have been discharged.

OUTPUT OF BLAST FURNACES OF UNITED STATES.*

September 1, 1901.

Location of Furnaces.	Coke and Anthracite.					Charcoal.				
	Total No. of Stacks.	In Blast.		Out of Blast.		Total No. of Stacks.	In Blast.		Out of Blast.	
		Number.	Weekly capacity.	Number.	Weekly capacity.		Number.	Weekly capacity	Number.	Weekly capacity.
New York	14	4	4071	10	4357	3	1	0	3	290
New Jersey	7	4	3115	3	1350	.....	.....	.....	.....	.....
Spiegel	3	3	528	0	0	.....	.....	.....	.....	.....
Pennsylvania:						13	2	92	11	470
Lehigh Valley	26	13	7684	13	5931	.....	.....	.....	.....	.....
Spiegel	1	1	126	0	0	.....	.....	.....	.....	.....
Schuylkill Val	14	10	7839	4	1840	.....	.....	.....	.....	.....
Upper Susqu. Val	2	1	1029	1	336	.....	.....	.....	.....	.....
Lower Susqu. Val	9	6	3619	3	931	.....	.....	.....	.....	.....
Spiegel	1	1	453	0	0	.....	.....	.....	.....	.....
Lebanon Valley	12	12	5875	0	0	.....	.....	.....	.....	.....
Pittsburgh Dis't	31	30	71193	1	1225	.....	.....	.....	.....	.....
Spiegel	1	1	2471	0	0	.....	.....	.....	.....	.....
Shenango Valley	15	13	15091	3	4333	.....	.....	.....	.....	.....
West'n Pennsylvania	20	13	17765	7	3088	.....	.....	.....	.....	.....
Spiegel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland	5	4	5195	1	1200	4	0	0	4	443
Wheeling District	9	6	7324	3	5744	.....	.....	.....	.....	.....
Ohio:						7	3	151	4	269
Mahoning Valley	15	13	26910	2	2810	.....	.....	.....	.....	.....
Central & Northern	14	13	23334	1	1400	.....	.....	.....	.....	.....
Hocking Valley	2	2	835	0	0	.....	.....	.....	.....	.....
Hanging Rock	12	8	4483	4	2014	.....	.....	.....	.....	.....
Illinois	16	16	32607	0	0	.....	.....	.....	.....	.....
Spiegel	1	1	1071	0	0	.....	.....	.....	.....	.....
Minnesota	1	0	0	1	763	.....	.....	.....	.....	.....
Wisconsin	5	3	3573	2	1176	.....	.....	.....	.....	.....
Missouri	1	0	0	1	570	.....	.....	.....	.....	.....
Colorado	2	1	2 86	1	3000	.....	.....	.....	.....	.....
Speigel	1	1	365	0	0	.....	.....	.....	.....	.....
Virginia	21	17	9393	4	2360	3	1	40	2	140
Kentucky	5	3	1382	2	935	3	0	0	3	200
Alabama	37	24	21401	13	8380	4	3	1073	1	329
Mich., Mo. and Wis	.....	.....	.....	.....	.....	11	7	4058	4	1019
Tennessee	15	1	5628	5	2227	4	2	423	2	280
Georgia	1	0	0	1	450	4	2	583	2	575
North Carolina	1	0	0	1	437	.....	.....	.....	.....	.....
New England	.....	.....	.....	.....	.....	7	2	185	5	290
Texas	.....	.....	.....	.....	.....	4	0	0	4	872
Utah	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	320	233	293256	87	56860	67	22	6605	45	583

SUMMARY.

Fuel.	In Blast.						Out of Blast.			
	Number.			Weekly Capacity.			Number.		Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.		Month Previous.
Charcoal	22	22	31	6,605	6,576	8,227	45	45	5,837	5,830
Coke and Anthracite	233	235	197	293,256	297,269	223,551	87	83	56,860	43,111
Total	255	257	228	299,861	303,847	231,778	132	131	62,697	48,941

*Condensed from the *Iron Age*. The decrease of unsold stocks, so far as these are reported (none of the stocks of the steel companies being included), was from 387,329 tons Aug 1, to 377,074 tons Sept. 1, or about 10,000 tons.

The Hill Machine Co., Anderson, Ind., manufacturers of pumping machinery, reports that it has recently shipped power pumps to towns in Texas, Minnesota, Wisconsin, Missouri, Kentucky and the the District of Columbia, also to several local customers. It has also received orders for steam deep well pumps of various sizes from Philadelphia, Baltimore, St. Louis, Minneapolis, Pittsburg, Chicago; Salem, Ohio; Rowan, Ia.; New Brighton, Pa.; Alpha, Ill.; Bedford City, Va.; Louisville, Ohio; Memphis, Tenn.; Republic, Mo.; Liverpool, England; Middlebranch, Ohio; Los Angeles, and others. Within the last year the company has added a line of power pumping machinery to be driven by gas and gasoline engines, electric motors or other power, which it states is meeting with universal appreciation.

The Kelly Foundry & Machine Co., Goshen, Ind., has added a fire-proof warehouse for storing patterns, two stories high, 50x75 feet dimensions, to its plant, and is installing new electrical equipment for lighting and heating its plant. The company report that its business has been growing rapidly, continually necessitating changes and additions to its plant and equipment. It recently filled a large order for pipe received from the Mineral Point & Zinc Co., Mineral Point, Wis.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of their Wants:—

On October 4 an application will be made for a charter for the Chester Iron & Steel Co. of Chester, Pa. The incorporators will be Henry P. Nash, Leo. Kayser and Thaddeus Weed. It is stated that as soon as the charter is secured the new company will take over the property of the Tidewater Iron & Steel Co.

The Brown Fence & Wire Co. of Cleveland, O., has been incorporated with a capital of $25,000. Robert Brown, James Brown, Andrew Brown and William Brown are the incorporators.

The Crescent Brake Shoe Co. of Philadelphia, Pa., has been incorporated with a capital of $5,000.

The Gadsden Foundry and Machine Shop have been incorporated and will at once equip for manufacturing tram cars, scoops, etc., at Gadsden, Ala. Incorporators: W. G. Bellenger, C. P. Smith, J. W. Williams, H. B. Murphy, F. W. Bellenger and R. B. Kyle. Capital, $10,000.

C. W. Tebault of the Security Real Estate Co., 719 Citizens' Bank Building, and associates are about to apply for the incorporation of the Norfolk Shipbuilding & Dry-Dock Co., with capital stock of $2,000,000 and bonded in $1,000,000, for the purpose of building a shipbuilding plant on waterfront property near Norfolk, Va. Five hundred acres have been secured as site.

Paso City Foundry & Machine Co., El Paso, Texas, is in the market for a 36-inch improved lathe; punch and shears, 42-inch throat, set rolls and horizontal boring mill.

The Alabama Consolidated Coal & Iron Co., Birmingham, Ala., is in the market for machine lathe, 18-inch swing, 8 feet between centers, and for a drill press to work up to 1½ inches, with at least 12-inch clearance from post to drill, second-hand.

Chas. P. Fitch, W. W. Parsons and Geo. B. Parsons have incorporated the Central Electric & Construction Co., Princeton, N. J., capital $5,000.

The Cranberry Furnace Co., Newark, N. J., will, under its recent charter, conduct a smelting business. Incorporators: Halsey M. Barrett, Frederick M. Lelbach and Frederick A. Lelbach. Capital, $100,000.

A charter has been issued to the American Saw Mfg. Co., Camden, N. J., capital, $100,000. Incorporators: Lucas G. Fouvier, Frank Flavel and Geo. W. Jessup.

The Bankers & Traders' Co., New York, has been incorporated by Horace C. Hunt, Brookline, Mass.; Jas. J. Allen and Chas. A. Decker, New York, with a capital of $250,000, to do a general contractors' business, to operate foundries and rolling mills, to supply electricity, to deal in real estate, etc.

K. K. McLaren, Louis B. Dailey and Augustus S. Meeker have incorporated the Miller Pasteurizing Machine Co., at Jersey City, and will manufacture machinery. Capital, $500,000.

Fires and Accidents:—

The Centennial Machine Shop at Calumet, Mich., was damaged to the extent of $1,000 by fire last week.

Moore & Butts' foundry and machine shop at West Newton, Pa., was damaged to the extent of $10,000 by fire on Sept. 6.

The machine shop and foundry of R. S. Putnam, Mendon, Mich., was destroyed by fire Sept. 10. Estimated loss, $5,000.

New Construction:—

The Utica Pipe Foundry Co. of Utica, N. Y., will erect a new office building to cost $6,000.

The capacity of the Greenville, Pa., plant of the Shelby Steel Tube Co. is to be greatly increased. A billet mill for rolling billets for piercing purposes will be installed to supply fully one-half of the mills operated by the combine.

A contract for the erection of the buidings of the Whitney Car Wheel Co.'s plant at Philadelphia, Pa., was let last week at $48,885.

Work has already been commenced on the erection of the

plant of the Altoona Foundry & Machine Co., Altoona, Pa. The buildings altogether will cover a plot of ground 100x170 feet. The molding floor and foundry department will be 50x 130 feet, machine and pattern shop, 40x50 feet, annealing department 10x50 feet, furnace and storage house 50x50 feet and the boiler house 20x40 feet. Swindell Bros. of Pittsburg, Pa., have been awarded the contract for erecting two gas producers, one open-hearth furnace and four annealing ovens.

A deal for the purchase of 40 acres of land near Washington, Pa., by the Jessop Steel Co. of England, was closed last week. The company will erect a large crucible steel plant on the site acquired. Work of erection will be commenced immediately.

The Toledo Wire & Iron Works of Toledo, O., will erect a new four-story building. The cost will be $75,000.

Woodstock Iron Co., Anniston, Ala., will rebuild and modernize No. 3 furnace, capacity daily to be 300 tons; No. 4 furnace will also be likewise improved when No. 3 has been completed. New washers are being erected and equipment for an electric-lighting plant has been purchased.

Wm. T. West & Co. will establish machine shops and tank works at Rowlandsville, Md., and will utilize the old rolling mill plant there.

The Red River Furnace Co. has been incorporated by Michael Savage, H. N. Leech, B. L. Rise and Samuel Ford, to mine and manufacture iron at Montgomery, Tenn. Capital, $200,000.

A new foundry and machine shop is being erected by the Angola Engine & Foundry Co., Angola, Ind., for the manufacture of gas engines and a general jobbing business. The foundry is a one-story brick building, 40x70 feet, and the machine shop is three stories high, including basement, 48x70 feet. F. D. Morse is president; J. W. McCrory, secretary and manager; O. Carver, treasurer, and B. Wood, superintendent. The company expects to begin manufacturing operations about Nov. 1 on a gas engine of special design.

The Pittsburg District:—

L. & R. Wister & Co., of Philadelphia, Pa., brokers and commission merchants in iron, steel, coal and coke, have opened a branch office in the Fitzsimmons Building, 331 Fourth Ave., Pittsburg. Mr. Stuart B. Marshall is resident manager. The company is selling agent for Dunbar iron, Saxton Furnace Co.'s foundry and forge iron, Paxton Iron & Steel Co.'s silver spring pig iron; Consolidated Iron & Steel Co.'s bar, band and hoop iron; American Sheet Iron Co.'s iron and steel sheets, Dunbar coke and coal, Semet-Solvay coke, and Bessemer iron. It also deals in old material.

The offices of the Westmoreland Steel & Mfg. Co., formerly located at Greensburg, Pa., have been transferred to 315 Fourth Ave., Pittsburg.

McClure & Co., dealers in tin plate and metals, whose offices and warehouse are located at 211 to 215 Second Ave., Pittsburg, have secured a controlling interest in the Washington Charcoal Iron Tin Mills at Washington, Pa., and at a recent meeting of the stockholders new officers were elected as follows: Thomas McClure, president; J. J. O'Connor, vice-president, and P. J. McNulty, secretary and treasurer. For some time this concern held a large interest in the tin plant, but desiring a change in management secured a controlling interest and thereby brought about the desired change.

At the recent annual meeting of the stockholders of the Pittsburg Mfg. Co. the following officers were elected: Geo. V. Milliken, president and treasurer; James C. Reymer, vice-president; Frank S. Jackman, secretary. Mr. Milliken succeeds Wm. Johnson, deceased. The concern builds Cosgrove patent straightening, bending and punching machines, and manufacture bolts, nuts, rivets and castings.

The Brook Forging & Mfg. Co. of New York has been incorporated with a capital of $30,000. The company will manufacture all kinds of drop forgings. W. H. Brook, F. W. Daggett, G. H. Townsend and I. E. Miller are the incorporators

W. H. Griffiths, of Washington, Pa., who recently sold his stock in the Washington Charcoal Iron Tin Mills to McClure & Co. of Pittsburg, intends erecting another tin plate plant at Washington as soon as a suitable site can be secured.

Promoters are considering the advisability of erecting a sheet mill at Arnold, near Latrobe, Pa. The capital of the new company will be about $150,000.

The Niles Boiler Co. of Niles, O., will increase its capital stock from $50,000 to $100,000, the additional capital to be used in enlarging the plant. R. G. Sykes is president and J. H. Orwig is secretary of the company.

C. W. Sadler, Arthur F. Saxton and Orson Cone have purchased the Windsor Locks Machine Co. plant at Windsor Locks, Conn. The change in ownership will become effective on Oct. 1.

The Pacific Coast Iron & Metal Co. of Butte, Mont., has been incorporated with a capital of $10,000. A. V. Velleman, R. Halzberg and John Miller are the incorporators.

The Red River Furnace Co. of Nashville, Tenn., has been incorporated with a capital stock of $200,000. One-half of this stock is 7 per cent, cumulative preferred, while the remainder is common. The incorporators are Michael Savage, Q. C. Atkinson, H. N. Leech, B. L. Rice and S. T. Ford.

The Acme Steel Co. of Chicago, Ill., has been incorporated with a capital stock of $45,000. C. Van Alen Smith, M. H. Haeger and K. F. Lane are the incorporators.

The West and Northwest:—

The Brighton Foundry Co., Chicago, has been incorporated with a capital stock of $6,000. The incorporators are Philip Summers, Olaf Westberg and Ernst Magull.

The Crucible Steel Co. of America, Jersey City, N. J., has been incorporated to do business in Illinois with a capital of $392,000.

The American Iron & Metal Co., Chicago, has been incorporated with a capital of $12,000. The company will deal in scrap iron, metals and machinery. Edward J. Rosenthal is the incorporator.

The Acme Steel Co., Chicago, has been incorporated with a capital stock of $45,000, to manufacture iron and steel and by-products. The incorporators are C. Van Alen Smith, M. H. Haeger and K. F. Lane.

Edwin H. Sedgwick, treasurer and general manager of the Wilks Mfg. Co., 53 South Clinton St., Chicago, and also partner in the firm of Sedgwick-Fisher Air Compressor Co., of the same address, died at his residence in Chicago Sept. 10, of apoplexy, after a year's illness, aged 59 years.

The American Hoist & Derrick Co., St. Paul, Minn., is building an addition to its foundry, and new machinery will be installed.

The Standard Railway Supply Co., St. Louis, Mo., has secured a large order for pneumatic tools from the Russian government.

The Milwaukee Malleable & Gray Iron Mfg. Co., Milwaukee, Wis., is contemplating an addition to its plant.

The Lennox Machine Co., Marshalltown, Ia., has added a new foundry 146x64 to its plant, which has double the capacity of the former shop.

The Dillon-Griswold Wire Co., Sterling, Ill., is increasing the capacity of its plant by the addition of 36 wire drawing blocks, making necessary an enlargement of the cleaning room, where two new bakers are being installed. The company is also increasing its bale tie department by installing six improved machines.

As the space devoted to floor molding has been entirely inadequate, and in order to relieve the works at Canal and Judd Sts. of some of the heavy work, Crane Co., of Chicago, has erected at its works at Jefferson, Van Buren and Desplaines Sts., a foundry which is to be devoted exclusively to very heavy work, i. e., flanged fittings and large valves. It is a one-story brick building with a slate roof, and is equipped with two cupolas, an electric traveling crane and other conveniences. This new foundry will increase the company's capacity for very heavy work about 50 per cent, and it is expected to be in operation in about 30 days.

Perry Ransom, manufacturer of tools and machinery, Oshkosh, Wis., reports a large number of orders for electrically driven tools. He expects to put on the market within the next few months several different sizes of grinders.

The Maywood Foundry & Machine Co., Maywood, Ill.,

shipped last week a set of molding machines to the Westinghouse Air Brake Co., Pittsburg, Pa., for making large air cylinder castings. The company has received orders for molding machines from the Whiting Foundry Equipment Co., Harvey, Ill., W. K. Henderson Iron Works, Shreveport, La.; and the Evert Rolling Mill Co., Boston, Mass.; also a large order from the Inland Steel Co., Chicago, for patterns, castings and machine work for soaking pits, annealing ovens, furnaces, etc., for the plant which this company is erecting at Indiana Harbor, Ind.

The Whiting Foundry Equipment Co., Harvey, Ill., has added a brick building, with iron trusses, 40x200 feet, to its shops, in addition to installing several new machines of different characters.

The Pacific Steel Co., Irondale, Wash., which recently purchased the property of the Puget Sound Iron Co., is rebuilding the blast furnaces and refitting the machine shop, and making other improvements.

W. D. Gray, B. T. Leuzarder and Henry C. Holthoff are promoting a company at Milwaukee, Wis., for the manufacture of Corliss engines and mining machinery. While the amount of capital to be invested has not yet been made public it is stated that it will reach nearly a half million dollars.

General Industrial Notes:—

The Harmon Whitmore Co. of Jackson, Mich., incorporated five years ago with a capital of $50,000, is one of the largest special mill machinery manufacturing concerns in the United States. The principal products of the company are the Whitmore purifier, the Wilson tubular dust collector and the Popular dust collector, all used in the milling trade. Outside of this line the collectors are being employed for taking care of dust from fans attached to lime mills, seed mills, cement mills, coal crushers, ore crushers, sugar refineries, sand papering machines, or to any fan discharging dust.

The Everett Furnace, at Everett, Bedford county, Pa., will be in blast this week.

The Juniata Furnace, Newport, Pa., which has received a new lining, will be blown in this week.

The daily shipments made by the Pressed Steel Car Co. still keep up above the 100 mark. During the week ending Sept. 13, the company shipped 628 cars, an average of 105 cars a day. To these are to be added large shipments of truck frames, bolsters, brake beams and other pressed steel specialties.

The Charles Moritz machine shop at Portsmouth, O., has been purchased by Albert Nourot and Robert Messersmith.

The plant of the Louisville Shovel Co., Louisville, Ky., is nearing completion and will be placed in operation shortly. The Louisville Bolt & Iron Co. has about completed its plant, the mills now being in position and operations will be commenced shortly.

No. 3 furnace of the Woodstock Iron Co. at Anniston, Ala., will be entirely rebuilt and the capacity will be increased to 300 tons daily.

The Marinette Iron Works, Marinette, Wis., manufacturers of the Walrath gas engine, have received an order for 11 engines from their Pittsburg office.

The Taft-Pierce machine shops at Noonsocket, R. I., were sold last week to Herman Hollerich of Washington, D. C. While the purchase price was not made public it is stated that the price paid amounted to more than $200,000. The new purchaser will incorporate the plant under the name of the Taft-Pierce Co.

Furnace A of the Colorado Fuel & Iron Co. at Pueblo, Colo., was blown in on Sept. 4. For the present the output will amount to about 300 tons daily, but upon the completion of the ore bins and the automatic charging device it will be increased to about 450 tons daily. The stack is 95 feet high and 21 feet in diameter at the bosh. The blast is furnished by 10 tuyeres each 6 inches in diameter. There are four stoves, each 105 feet high and 21 feet in diameter. For the present the molten metal will be cast into pigs, but upon the completion of the Bessemer steel plant the molten metal will be conveyed to the Bessemer converters in ladles with capacities ranging from 15 to 20 tons each.

Ella F. Cooke last week commenced suit at Cleveland, O., against the Commonwealth Iron Co. to recover $36,295, which she claims is due her in dividends on 1,037 shares of stock which she owns in the company.

The Chesapeake Nail Works, Harrisburg, Pa., has advanced the puddling rate to $4 per ton. This is an advance of 25 cents a ton.

At the annual meeting of the stockholders of the LaBelle Iron Works, held at Wheeling, W. Va., last week, directors were elected as follows: John E. Wright, C. A. Robinson, H. Bieberson, J. E. Sinclair, Harry Franzheim, John Wright and A. J. Clark. J. E. Wright was elected president, W. E. Beswick secretary, and William Travis, manager.

The Lobdell Car Wheel Co., Wilmington, Del., has blown in its furnace at White Rock, Va.

The Colonial Paint & Varnish Co. is erecting a substantial addition to its plant in Cleveland with an estimated capacity of 2,000 gallons of Colonial oil per day.

The first year's operations at the plant of the Peru Steel Casting Co., Peru, Ind., have proved quite successful. A large business has been built up and the company is employed to its full capacity. The castings produced have combined toughness with good machining quality and uniformity in chemical and physical properties. The basic open-hearth process is employed exclusively. The company is one of few to produce basic castings, the Tennessee Coal, Iron & Railroad Co. being another. An addition is being built at the Peru foundry to provide more room for the finishing department.

At the annual meeting of the stockholders of the Franklin Air Compressor Co., held at Franklin, Pa., on Sept. 2, the following officers were re-elected: President, Charles Miller; vice-president, J. W. Duntley; secretary and general manager, Samuel G. Allen; treasurer, O. D. Bleakley. The board of directors consists of Charles Miller, J. W. Duntley, J. S. Coffin, W. P Pressinger, S. A. Megeath, W. H. Forbes, C. J. S. Miller, S. C. Lewis and S. G. Allen.

The Avery Stamping Co. of Cleveland announces that it manufactures wrought steel washers, both standard sizes and special, if ordered in quantities which warrant making special tools for their manufacture. Only one gauge is put in a keg, not different thicknesses in the same keg. The holes are all punched centrally. The washers are flat and are tumbled in a tumbling barrel, thus taking off all wire edges, so the user's hands are not cut in handling them. All are sorted so as to get out the slugs, and all cut-edge washers are eliminated from the kegs. The company also makes a specialty of cutting, shearing, stamping and blanking sheet steel to special shape.

The Collier Shovel & Stamping Co. of Washington, Ind., has been consolidated with the Chicago Steel Mfg. Co. of Chicago, Ill. The price paid for the plant was $150,000 and the capital stock of the consolidated companies is to be increased from $500,000 to $650,000. Officers of the consolidation are as follows: F. S. Hutchinson, president; F. M. Baldwin, first vice-president; A. F. Cabel, second vice-president; M. S. Denslow, treasurer; L. H. O'Donnell, secretary.

The foundry department of the Youngstown Engineering Co. of Youngstown, O., resumed operations last week.

The Altoona Foundry & Machine Co., Altoona, Pa., has commenced work on their new buildings. They will cover an area of 100x170 feet.

The Peninsula Foundry Co., S. J. Wright, proprietor, has purchased a tract of land at Newport News, Va., and ground has been broken for a foundry, 200x75 feet. The old foundry will continue operations.

The final papers have been signed in Pittsburg whereby 40 acres of land on the Gordon farm, near Washington, Pa., become the property of the Jessop Steel Co., of England, and this will be the site of the company's steel plant. The company expects to erect buildings which will cover from 10 to 12 acres. A location to the north of Jessop's will be taken by W. H. Griffiths on which he will erect a mill for the manufacture of charcoal iron tin plates. Another plant will be erected on the property lying between the Jessop and Griffiths locations.

The Bridgeport Malleable Iron Co., Bridgeport, Conn., is in need of greater facilities and will tear down and replace some of the buildings in connection with their gray iron department.

COCHRANE HEATERS.

The **Cochrane Heaters** are of generous proportions, giving sufficient space for the free passage of the steam through the heater, without lifting water, and without creating any back pressure; they are also of sufficient water carrying capacity to permit a very slow travel of the water through the filtering material to the pump suction opening. To the water temporarily carried no further heat is applied, all of the heating having been accomplished before the water dropped into the quiet pool carried in the bottom of the heater.

If you are interested in the subject of feed-water heaters, we would be glad to hear from you.

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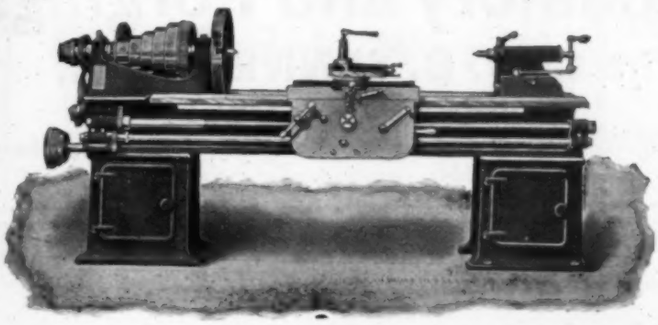

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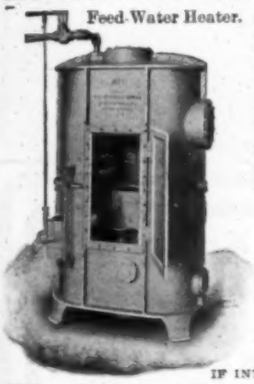

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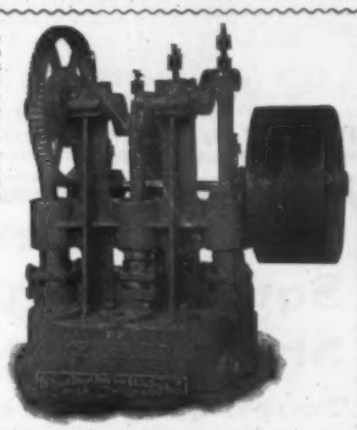

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THE FOUNDRY believes that those who are making castings today are interested more in what has been accomplished than what it is possible to do, therefore its columns are kept free from too theoretical problems, and actual practice instead is illustrated.

The following are the contents of a recent issue of **The Foundry:**

Trade Outlook.
A Modern Foundry. Illustrated.
Convention of A. F. A.
Kranks' Korner.
A Cheek Without Bars or Gaggers. Illustrated. Richard Barnett.
Repeat Castings. Illustrated. George Buchanan.
Name Plates. Edmund S. Sperry.
Newten Cupola. Illustrated.
Sly Water Mill Illustrated.
Construction and Management of Cupolas. Thos. D. West.
What Will Make Iron Wear? W. Osborne.
Good Thing for Bench Molders. Illustrated.
Why Foundries Lack Competent Foremen. Wm. H. King.
Anthracite Coal as Cupola Fuel. T. F. Stimpson.
Delano Pulley Molding Machine. Illustrated.
Among the Foundries.
Air Furnace Metal.
Chimmie Powers' Answers.
Cast Iron Car Wheels. William Fawcett.
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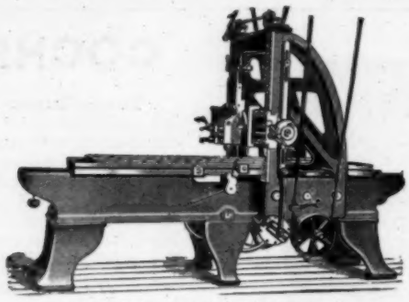

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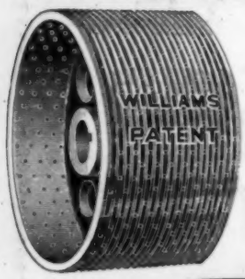

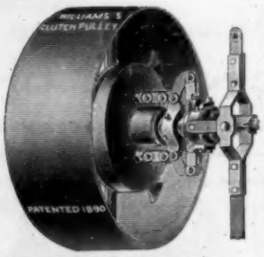

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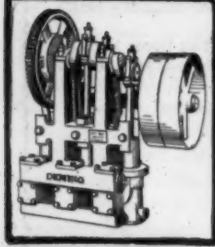

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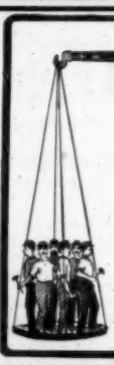

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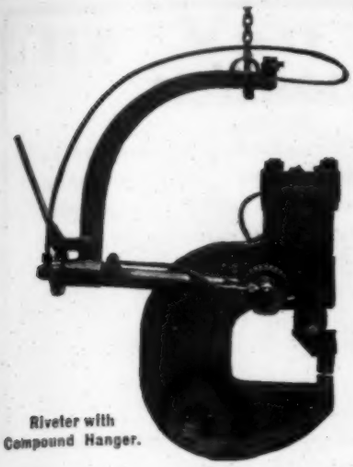

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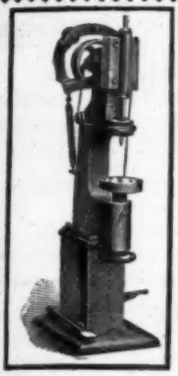

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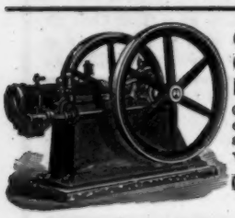

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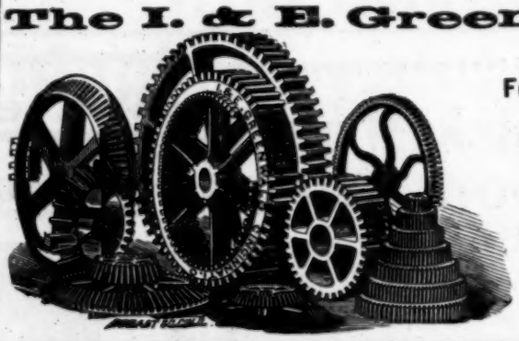

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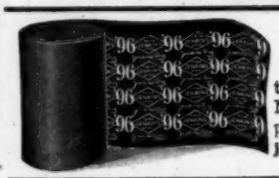

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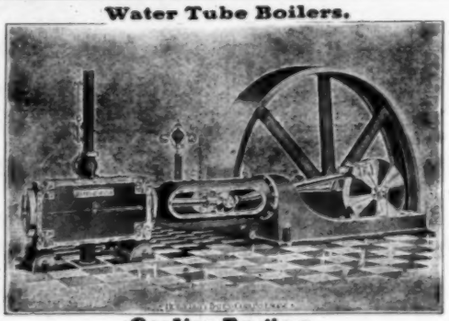

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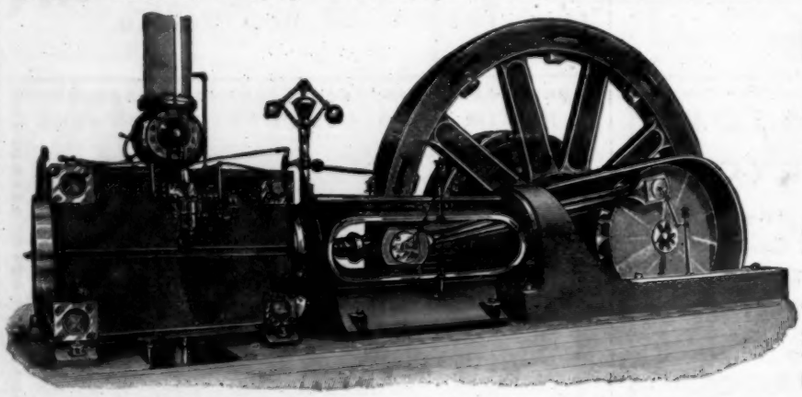

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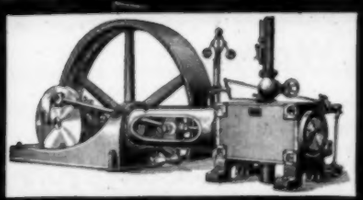

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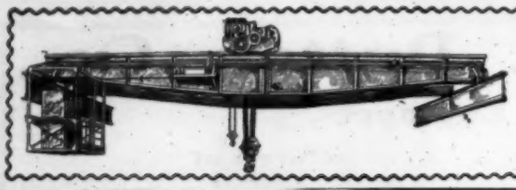

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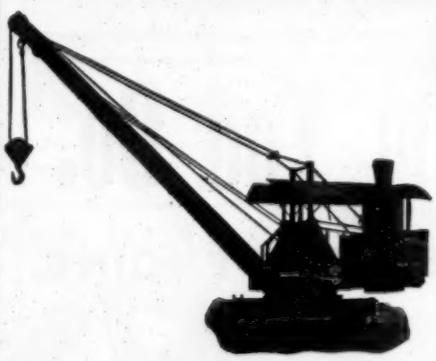

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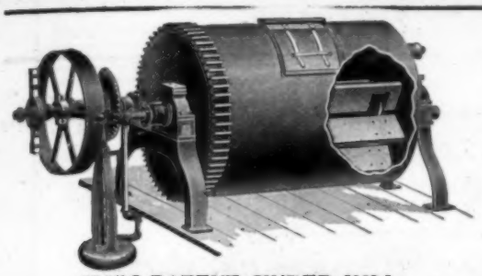

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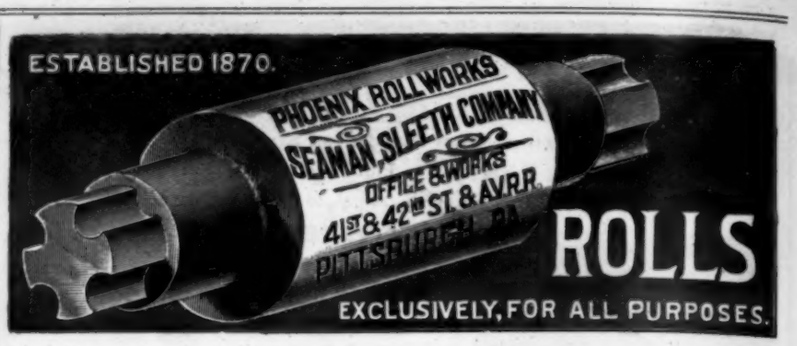

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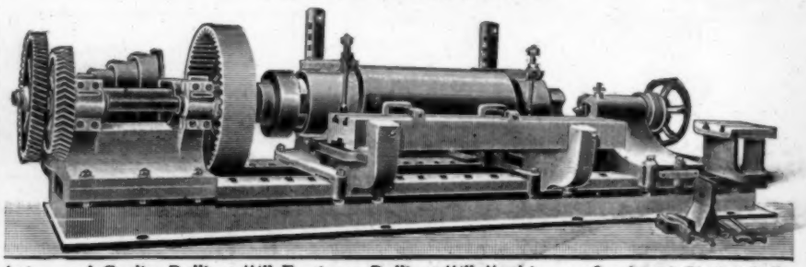

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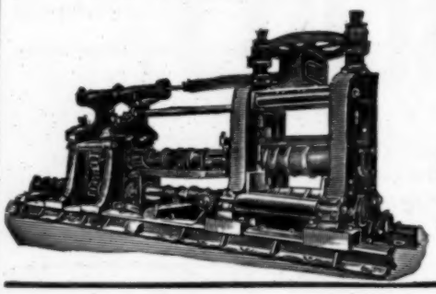

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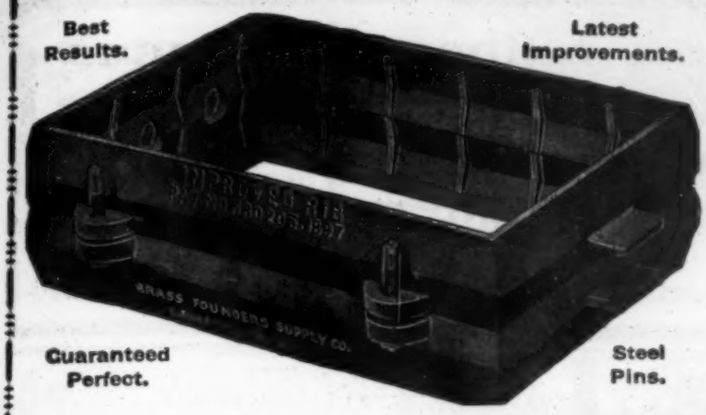

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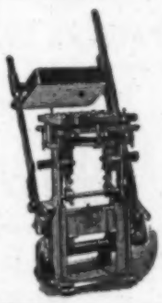

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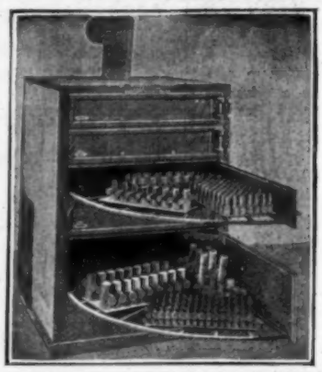

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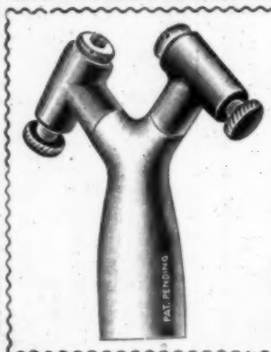

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